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September 1972

ENVIRONMENTAL PROTECTION TECHNOLOGY SERIES

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Projects of the Municipal Technology Branch Through June 1972

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EPA-R2-72-080
September 1972

PROJECTS

OF THE

MUNICIPAL TECHNOLOGY BRANCH

THROUGH JUNE 1972

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MUNICIPAL TECHNOLOGY BRANCH
OFFICE OF RESEARCH AND MONITORING
U. S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D. C. 20460

PROGRAM AREA: MUNICIPAL TECHNOLOGY

PROGRAM ELEMENTS: 1B2033
1B2034
1B2035
1B2043
1B2044
1B2045

OFFICE OF RESEARCH AND MONITORING
U. S. ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D. C. 20460

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ABSTRACT

Projects of the Municipal Technology Branch - July 1972 is a compilation of the information sheets of the 448 projects initiated since fiscal year 1967 through fiscal year 1972. Each sheet contains the objectives, fiscal information, and a brief description of an initiated project.

General information on the mission of the Municipal Technology Branch, its needs, problems, accomplishments, organization and resources history is also presented. Since inception of the original water program under FWPCA/FWQA, a new Program Planning System has been developed to provide Office of Research and Monitoring's planning input for the Environmental Protection Agency's Resource Management System. This change has resulted in some realignment of operating unit mission designations and subsequent assignment of new Program Element Numbers. The following listing correlates the two numbering systems:

Program Area: Municipal Technology

1B2033	Municipal Sewered Discharges (formerly 11010).
1B2034	Combined Sewer Overflows & Storm Water Discharges (formerly 11020, 11030, 11040).
1B2035	Non-Sewered Domestic Wastes (formerly 11050, 13050).
1B2043	Treatment Process Development and Optimization (17010, 17020, 17030, 17040, 17050, 17060, 17070, 17080, 17090, 17100-17110).
1B2044	Cold Climate Waste Treatment (formerly 16100).
1B2045	Water Quality Control (formerly 16080).

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1) When only "GPO" and price is listed, documents (in paper copy form) are available from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402, at the specified price, and can be ordered by title.

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MUNICIPAL TECHNOLOGY BRANCH

OBJECTIVES

Primary Program Objectives:

Develop and Demonstrate Technology

1. Required to impact the waste water treatment facility construction grant program
   a. Output for formulated technology transfer program
2. For controlling urban runoff pollution (Combined Sewer Overflows and storm water)
3. For conservation of water resources by reuse of waste water
4. For additional use and recycling of waste water sludges
5. Applicable to abatement of pollution in cold climates
6. For management of wastes from multiple sources; i.e. by means other than direct treatment of effluent streams

Service Functions

1. Specialized research and development related to high impact environmental problems; i.e. heavy metals, nutrients
2. Technical assistance to other EPA units, consulting engineers, other Federal and non-Federal agencies and municipalities

NEEDS

Develop and demonstrate new processes and treatment systems for removing the full range of wastewater constituents

Develop and demonstrate new and improved methods of controlling and treating combined sewer overflows and storm water

Produce full capability to reuse wastewaters

Develop sludge recycling capability

Transfer new technology to user programs

Develop technology to minimize pollutional effects

Develop technology for management of waste discharges

PROBLEMS

1. Conventional wastewater treatment plants lack capability to perform at levels adequate to meet water use needs and environmental concerns

2. Capability to dependably renovate municipal wastewaters for full spectrum reuse is lacking

3. Pollution from combined sewer overflows and storm water discharges is a major problem requiring new technology

4. Wastewater sludges pose a major pollution problem for which cost effective solutions are not available

5. Even with the development of treatment technology for all effluent streams, pollution problems will still exist. Alternative control strategies must be developed

ACCOMPLISHMENTS

1. Phosphorus removal processes
2. Activated carbon organics removal processes
3. Oxygen and ozone processes for organics removal
4. Biological nitrogen removal process
5. Techniques for upgrading municipal treatment plants
6. Methods for land application of sludges and wastewaters
7. Control techniques and treatment processes applicable to combined sewer overflows and stormwater discharges
8. Computer-assisted control of collection, transport and treatment systems
9. New type pressure sewer system, including a new home sewage pump-storage-grinder unit
10. Technology for control of pollution from mercury in lake and stream sediments

11. Engineering methodology for the reaeration of rivers and lakes
12. Phosphate-free home laundry detergents
13. Design of an Alaska native village community water supply and pollution control facility
14. Development of environmental guidelines for road construction in Alaska

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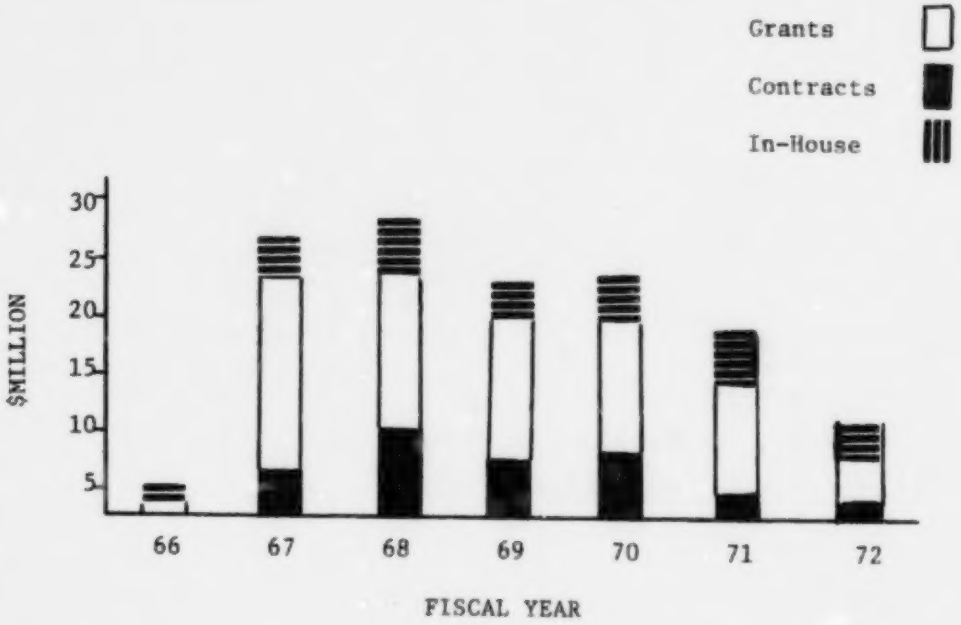

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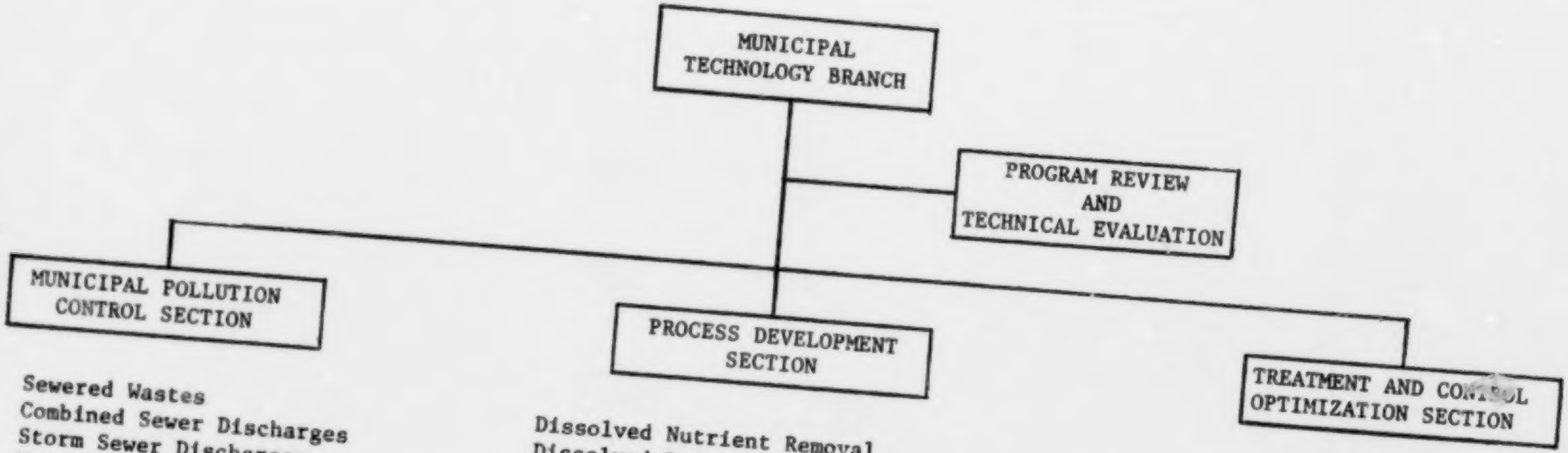
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PROCESS DEVELOPMENT SECTION
TREATMENT AND CONTROL OPTIMIZATION SECTION

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Combined Sewer Discharges
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Non-Sewered Municipal Wastes

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Dissolved Refractory Org. Removal
Susp. & Colloidal Solids Removal
Dissolved Inorganics Removal
Dissolved Biodegradable Org. Removal
Microorganisms Removal

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SEWERED WASTES

NON-SEWERED MUNICIPAL WASTES

2-A

Sewered Wastes
Non-Sewered Municipal Wastes

This program involves the development and demonstration of technology for the effective and economical control of pollution from sewered wastes, combined sewer discharges, storm sewer discharges, non-sewered runoff, non-sewered municipal wastes, and joint municipal/industrial wastes. The number of sewered communities in the United States is just under 13,000, serving 68% of the Nation's population. Raw or inadequately treated sewage from millions of people still flows into our streams. Although many communities have been installing and improving their waste treatment facilities, over 1,000 communities outgrow their treatment systems each year. It is estimated that waste loads from municipal systems will increase nearly four times over the next 50 years.

Increasing demands for more efficient and more economical methods of collecting and treating sewered wastes face every urban community. Treatment problems associated with blends of industrial and municipal wastes in a municipal treatment plant exist now and will increase as higher water quality standards must be met. In many cases, technology is not available for determining the effects of industrial wastes on municipal treatment processes. Cost studies indicate that a major investment, totalling about $14 billion, will be necessary over the next five years to achieve adequate levels of treatment for the Nation's municipal wastes.

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Municipal Sewered and Non-Sewered Wastes

Report Number	Title/Author	Source*
11010DUZ02/71	Effect of Hypochlorite on Microbial Slimes; by Johns Hopkins Univ., Baltimore, Md.	(Under review)
11010EGO01/71	Phosphorus Removal by Ferrous Iron and Lime; by Rand Development Corp., Cleveland, Ohio, and County of Lake, Painesville, Ohio	(At press)
11010ESQ08/-1	Design Guides for Biological Wastewater Treatment Process; by the City of Austin, Texas, and the Center for Research in Water Resources, Univ. of Texas, Austin, Texas	(At press)
11010EVE01/71	Evaluation of Conditioning and Dewatering Sewage Sludge by Freezing; by Sewerage Commission of the City of Milwaukee, Wisconsin	GPO - 70¢
11010FLQ03/71	Phosphorus Removal with Pickle Liquor in an Activated Sludge Plant; by Sewerage Commission of the City of Milwaukee, Wisconsin	GPO - $1.25
11010FMY10/70	Engineering Feasibility Demonstration Study for Muskegon County, Michigan Wastewater Treatment-Irrigation System; by Muskegon County Board and Dept. of Public Works, Muskegon, Michigan	GPO - $1.50
11050FKE12/69	A Study of Flow Reduction and Treatment of Wastewater from Households; by General Dynamics Electric Boat Div., Groton, Conn.	GPO - $1.25

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2)*,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 DAB

TITLE OF PROJECT: "Chemical Clarification, Carbon Filtration and Adsorption, and Phosphate Removal as Secondary Treatment for Rocky River Wastewater Plant"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Board of County Commissioners Cuyahoga County 1219 Ontario Street Cleveland, Ohio 44113	Mr. Arthur M. Masse National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site:
Rocky River, Ohio

DESCRIPTION OF PROJECT

Award Date: 8-16-69	Project Cost: $2,573,810
Completion Date: 7-31-72	Federal Cost: $991,350

Summary:

The Rocky River Plant will demonstrate physical-chemical treatment at 10 MGD in place of conventional biological activated sludge. Polymer flocculants will be used for chemical clarification; phosphate removal will be effected by use of various coagulants and coagulant aids. The primary clarified effluent will be passed through columns of activated carbon for filtration of suspended solids and adsorption of organic pollutants. Preliminary studies will be made to select polymers and coagulating chemicals for achieving the most effective treatment of the full-scale waste stream. The plant will include sludge disposal from the primary tanks by anaerobic digestion, digester solids will be incinerated; digester supernatant will be treated in a small activated sludge unit which includes mineral addition. Operating procedures, design criteria and cost information will be developed during the demonstration phase.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010DGA

TITLE OF PROJECT: "Improved Trickling Filter-Based Treatment System"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of North Carolina Chapel Hill North Carolina 27514	Mr. R. L. Bunch National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Chapel Hill
North Carolina

DESCRIPTION OF PROJECT

Award Date: 6/6/69

Completion Date: 6/6/72

Project Cost: $595,000

Federal Cost: $595,000

. Summary:

The overall goal of this project is to develop practical design information which can be readily used by engineers in modifying trickling filter plants to enhance their performance and to develop practical techniques which can be applied by plant operators to attain maximum performance from existing and proposed units. Major experimental efforts during initial phases of the project will be directed towards improvement of BOD, suspended solids and nutrient removal.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 DJC

TITLE OF PROJECT: "New Process to Improve Quality of Trickling Filter"

GRANTEE OR CONTRACTOR:
Borough of Manville
Manville, New Jersey

EPA PROJECT OFFICER:
William Librizzi
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: Manville, New Jersey

DESCRIPTION OF PROJECT

Award Date: July 8, 1968

Project Cost: $694,100

Completion Date: Feb. 28, 1973

Federal Cost: $425,000

Summary: The project objective is to demonstrate the feasibility of a Moving Bed Filter (MBF) on a full-scale operation. Four automated MRF units of the capacity of .5 MGD will be installed for clarification of trickling filter effluent. The principle of the filter is the use of continuous countercurrent sand filter bed in which the sand is cleansed and recycled. Movement in the filter is accomplished by a hydraulic diaphragm.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 DKI

TITLE OF PROJECT: "Porteous Process for Heat-Treatment of Sludge"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Lake County, Ohio Court House Painesville, Ohio 44077	Mr. Joseph Farrell National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site:
Painesville, Ohio

DESCRIPTION OF PROJECT

Award Date: 1/15/69

Completion Date: 9/30/73

Project Cost: $377,099

Federal Cost: $645,907

Summary:

This project will permit the demonstration of a new and improved sewage sludge dewatering and disposal operation. The project will encompass treatment of sludge from Lake County's Mentor and Madison plants as well as sludge from other selected locations. It is important to achieve improved sludge handling and dewatering capability in order to reduce sludge handling costs, improve treatment efficiency and reliability and alleviate persistent operating problems in sludge handling and disposal systems. A sludge heat-treatment process, the Porteous Progress, will be used to alter the physical nature of sludge which filters poorly and at considerable expense into a suspension which is readily dewatered.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 DNT Contract 14-12-480

TITLE OF PROJECT: "Operations Research and Logistics for Advanced Waste Treatment Research Program"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Louis Koenig-Research	Patrick M. Tobin
Box 108, Rt. 10	Environmental Protection Agency
San Antonio, Texas 78206	Washington, D.C. 20460

Project Site: San Antonio, Texas

DESCRIPTION OF PROJECT

Award Date: Dec. 31, 1968	**Project Cost:** $54,628
Completion Date: June 30, 1972	**Federal Cost:** $54,628

Summary: To apply methods of operations research and logistical analysis in order to generate quantitative guidelines for the establishment of priorities for Research and Development effort on advanced waste treatment projects. Parametric costs studies, sensitivity analysis, and statistical geography will be used to develop the techniques for making management decisions to maximize "research pay-off per dollar of research and development effort."

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11010 DPW

TITLE OF PROJECT: "Land Reclamation Through the Use of Digested Sludge"

GRANTEE OR CONTRACTOR:
The Metropolitan Sanitary
District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611

EPA PROJECT OFFICER:
Kenneth Dotson
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date: June 5, 1969

Completion Date: May 31, 1970

Project Cost: $1,221,000

Federal Cost: $610,500

Summary: The project objectives are to demonstrate the ultimate disposal of digested municipal sewage sludges through use of special agricultural management practices to raise crops on land that is receiving an accelerated rate of application of sewage sludges. It is hoped that an economical scheme for nonpollutional sludge disposal will result with the additional promise of a beneficial by-product, agricultural crops.

The project will be the intermediate stage in a development program. The first phase was the initial feasibility studies. This phase will handle the sludge from an average sewage flow of 270 MGD. The final goal is to have a full-scale facility that will have the long-term capacity to utilize the digested sewage sludge from Chicago's West-Southwest, Calumet and North Side Treatment Plants. With a 21,500 acre agricultural area, this will be possible for the design year 2015. This project will establish design criteria for the full-scale facility.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 DUZ

TITLE OF PROJECT: "Fluid Friction in the Presence of Non-Rigid Boundaries"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
The John Hopkins University 34th & Charles St. Baltimore, Maryland 21218	C. L. Swanson National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Baltimore, Maryland

DESCRIPTION OF PROJECT

Award Date: April 1, 1969 — Project Cost: $35,030

Completion Date: March 31, 1970 — Federal Cost: $33,264

Summary: To investigate the mechanism responsible for this high frictional resistance in the presence of slime layers. Experiments are undertaken to determine the functional relationships between the essential parameters. With this information it should be possible to derive criteria for effective control of aquatic slime layers taking into account chemical as well as physical aspects.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11060 DXX

TITLE OF PROJECT: "Demonstration of Phosphate Removal and Other Wastewater Treatment Techniques"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Fort Wayne, Indiana One Main Street Fort Wayne, Indiana 46802	Mr. Ralph Christensen Region V Environmental Protection Agency 1. N. W. Wacker Drive Chicago, Illinois 60606

Project Site:
Fort Wayne, Indiana

DESCRIPTION OF PROJECT

Award Date: 4/18/69	Project Cost: $377,600
Completion Date: 12/31/71	Federal Cost: $283,200

Summary:

Plant and pilot scale process development for optimizing phosphate removal by the activated sludge process for joint municipal-industrial waste. Objectives are (1) conduct survey of industrial wastes, (2) study and evaluate two methods of desorbing phosphate from activated sludge (3) determine the effects of various industrial wastes on sludge bulking and phosphate removal for joint industrial-municipal wastes in a full scale demonstration, (4) determine effects of waste lime carbonate from its water treatment facility, on the process, at varous points of applications, and (5) provide necessary design criteria and plant requirements for phosphate removal for joint industiral municipal wastes.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: **11010 DZY**

TITLE OF PROJECT: **"Model Advanced Waste-Treatment Plant"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Washington Suburban Sanitary Commission **4017 Hamilton Street** **Hyattsville, Maryland 20781**	**Mr. Fred Bishop** **Washington Pilot Plant** **5000 Overlook Avenue, S. W.** **Washington, D. C. 20032**

Project Site:
Piscataway, Maryland

DESCRIPTION OF PROJECT

Award Date: **January 1967**	Project Cost: **$3,200,000**
Completion Date: **January 1972**	Federal Cost: **$2,400,000**

Summary:

To design and construct a 5 mgd advanced waste-treatment plant at the Washington Suburban Sanitary Commission's Piscataway Wastewater Treatment Plant to demonstrate high efficiency removal of phosphorous, BOD suspended solids and refractory organics. The following unit processes will be employed: lime precipitation, lime recovery, recarbonation, filtration, activated carbon adsorption, and activated carbon regeneration.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *,*
Federal Water Pollution Control Act (PL 84-660), as *amended.*

PROJECT NUMBER: 11010 EBW

TITLE OF PROJECT: "Performance Analysis of 15 MGD Microstrainer for Tertiary Treatment"

GRANTEE OR CONTRACTOR:
The Metropolitan Sanitary
District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611

Project Site: Chicago, Illinois

EPA PROJECT OFFICER:
Joseph F. Roesler
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 26, 1969

Project Cost: $568,284

Completion Date: July 15, 1971

Federal Cost: $146,927

Summary: The MSDGC plans to install a 15 MGD microstrainer for tertiary treatment at their North Side Treatment Plant. This will be the largest such facility in this country, and will afford FWPCA an opportunity to verify its mathematical model development and obtain realistic cost and performance information on a large scale plant.

The facility is designed to meet an effluent quality criteria of 5.0 mg/l of suspended solids and 4.0 mg/l of 5 day BOD at a feed concentration of 18.0 mg/l of suspended solids and 13.0 mg/l of BOD.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6(a)(2)(Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11010 EDE**

TITLE OF PROJECT: **"Pomona Research and Development Facility"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Los Angeles County Sanitation District No. 2 **2020 Beverly Boulevard** **Los Angeles, California 90057**	**Mr. Arthur Masse** **National Environmental Research Center, AWTRL** **Environmental Protection Agency** **Cincinnati, Ohio 45268**

Project Site:
Pomona, California

DESCRIPTION OF PROJECT

Award Date: **1/30/68**

Project Cost: **$950,608**

Completion Date: **6/30/72**

Federal Cost:	
FY '69	**$155,545**
FY '70	**$257,297**
FY '71	**$347,308**
FY '72	**$190,458**

Summary:

The pilot plant located at the site of the Pomona Water Renovation Plant has been investigating the advanced waste treatment processes since 1964. Studies at this location have included carbon adsorption of secondary effluent, reverse osmosis, electrodialysis, ion exchange, columnar denitrification, and phosphate removal by mineral addition to the activated sludge process. Recent work has included a physical-chemical treatment system to simulate the Rocky River, Ohio flow sheet. Also studies on the aerobic digestion of conventional sludge are being conducted.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11060 EGB

TITLE OF PROJECT: "Advanced Waste Treatment at Painesville, Ohio"

GRANTEE OR CONTRACTOR:
City of Painesville
7 Richmond Street
Painesville, Ohio 44077

EPA PROJECT OFFICER:
Mr. J. Westride
National Environmental Research
Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site:
Painesville, Ohio

DESCRIPTION OF PROJECT

Award Date: 2/4/70

Completion Date: 6/15/73

Project Cost: $1,369,000

Federal Cost: $684,500

Summary:

The project objectives are to demonstrate and evaluate a physical-chemical process for treating a combined municipal-industrial wastewater on a full scale (5 MGD) level. The waste stream includes 0.5 MGD of oily waste from an oil additive manufacturer and chemical wastes from several other large industries that result in a combined waste that is difficult to treat biologically. The industrial waste water is over one-half the total plant flow. The treatment train includes: (1) addition of lime or iron salts and polyelectrolyte to the primary clarifier; (2) coarse sand filtration; (3) granular carbon adsorption; (4) chlorination, and (5) carbon regeneration.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 EGL

TITLE OF PROJECT: "A Demonstration on Enhancement of Effluent From A Trickling Filter Plant"

GRANTEE OR CONTRACTOR:
City of Richardson
P. O. Box 309
Richardson, Texas 75080

EPA PROJECT OFFICER:
R. C. Brenner
National Environmental Research
Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Waste Water Treatment Plant
Richardson, Texas

DESCRIPTION OF PROJECT

Award Date: June 23, 1969 Project Cost: $276,035

Completion Date: June 30, 1970 Federal Cost: $200,276

Summary: The project objective is to upgrade the treatment of wastewater in a medium-sized (1.5 mgd) trickling filter plant by chemical addition. Controlled doses of metallic salts (aluminum and iron) with the dual capability of improving suspended solids coagulation and precipitating soluble phosphorus and an anionic polymer will be utilized. The project will also demonstrate the relative costs of operating a standard rate trickling filter sewage treatment plant by the use of selected chemicals and combinations of chemicals and polymers.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11010 EGO Supp.**

TITLE OF PROJECT: **"Water Pollution Abatement Program for Mentor, Ohio"**

GRANTEE OR CONTRACTOR:

County of Lake, Ohio
Court House
Painesville, Ohio 44077

Project Site:
Mentor, Ohio

EPA PROJECT OFFICER:

Mr. Ralph Christensen
Region V
Environmental Protection Agency
1. N.W. Wacker Drive
Chicago, Illinois 60606

DESCRIPTION OF PROJECT

Award Date: **6/24/70**

Completion Date: **12/31/70**

Project Cost: **$57,990**

Federal Cost: **$43,493**

Summary:

The objective of this supplemental award is to provide an additional four months of operation for collection of operating data to further evaluate the effectiveness and reliability of the system of phosphate removal being demonstrated. In addition, laboratory and bench scale studies will be conducted to further determine the exact nature of the chemical and physical reactions taking place in the process.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11010 EGZ**

TITLE OF PROJECT: **"Demonstration of Virus Removal from Municipal Sewage"**

GRANTEE OR CONTRACTOR:
City of San Antonio, Texas
Department of Public Works
City Hall Military Plaza
San Antonio, Texas 78205

Project Site:
San Antonio, Texas

EPA PROJECT OFFICER:
Mr. Carl Brunner
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: **8/1/69**

Completion Date: **7/31/73**

Project Cost: **$578,800**

Federal Cost: **$423,750**

Summary:

The objectives of the proposed grant are as follows:

1. To demonstrate the suitability of lime coagulation for removal of virus from municipal sewage.

2. To prevent the creation of an imminent public health hazard from the rapid, natural percolation of sewage treatment plant effluent; containing active viruses into the outcropping limestone aquifer used by the City of San Antonio as its water supply.

3. To demonstrate that use of this proces as the primary treatment step can provide additional benefits of considerable economic value.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: **11010 ELP**

TITLE OF PROJECT: **"Study Involving Aeration to Freshen Sewage and Retard Bacterial Activity in Long Sewer Lines"**

GRANTEE OR CONTRACTOR:
Jefferson Parish, Louisiana
Department of Sanitation
600 Helois Street
Metaire, Louisiana 70005

EPA PROJECT OFFICER:
Mr. John English
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site:
Metairie, Louisiana

DESCRIPTION OF PROJECT

Award Date: **6/27/68**

Project Cost: **$24,000**

Completion Date: **12/31/71**

Federal Cost: **$18,000**

Summary:

The primary objective of this grant is to evaluate the effectiveness of various methods of in-sewer aeration for reducing hydrogen sulfide problems and to develop design data for future designs. Facilities constructed previously are two aspirated air U-tube systems for force mains, one in-line venturi aspirator in a force main, and one eductor or air-life pump installed in a force main.

Excellent oxygen transfer has been obtained with the U-tube systems. However, pressure losses are higher and air aspiration rates are lower than those predicted from pilot studies. Design modifications to the U-tube systems are needed to optimum system performance and develop reliable design data for future systems. This 6-phase program is to modify downleg elbow design, characterize system performance, and install revised venturi-aspirators to increase oxygen transfer.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 ENK

TITLE OF PROJECT: "The Use of Iron Salts and Organic Polyelectrolytes for Removal of Phosphorus from Municipal Sewage"

GRANTEE OR CONTRACTOR:
City of Grand Rapids, Michigan
Wastewater Treatment
1300 Market Avenue, S.W.
Grand Rapids, Michigan

EPA PROJECT OFFICER:
Edwin F. Barth
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Grand Rapids, Michigan

DESCRIPTION OF PROJECT

Award Date: January 8, 1970 **Project Cost:** $533,889

Completion Date: August 15, 1971 **Federal Cost:** $355,634

Summary: The project objective is to remove phosphorus from municipal sewage by the addition of iron salts and an organic polymer to the influent of the Grand Rapids activated sludge treatment plant on a full scale (45 MGD). The grantee will further determine the effect of the chemical addition on the different unit processes such as, reduced organic loading on the activated sludge process, reduced BOD and suspended solids in the final effluent, and improved solids handling and disposal.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: **11010 ENX**

TITLE OF PROJECT: **"Basic Research on Sulfide Occurrence and Control in Sewage Collection Systems"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
County Sanitation District No. 2 Los Angeles County 2020 Beverly Boulevard Los Angeles, California 90057	Mr. John English National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site:
Los Angeles, California

DESCRIPTION OF PROJECT

Award Date: 3/1/68	Project Cost: $250,600
Completion Date: 2/28/71	Federal Cost: $187,950

Summary:

The objective of this research is to provide a rational basis for determining under what conditions sulfides will occur in a sewage collection system and how to control sulfide to prevent corrosion within the system. The following specific objectives are proposed:

1. To investigate and define the inter-relationship of the basic parameters governing the occurrence of sulfide in a sewage collection system.

2. To investigate corrosion of concrete pipe, defining the factors involved and the rate of corrosion.

3. To investigate the effectiveness of various methods of treatment to control sulfide generation, hydrogen sulfide evolution and concrete corrosion.

4. To present an economic comparison of the various treatment methods.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 EYM Contract 14-12-818

TITLE OF PROJECT: "EPA-DC Pilot Plant

GRANTEE OR CONTRACTOR:
Dept. of Sanitary Engineering
District of Columbia
415 12th Street N.W.
Washington, D.C. 20004

EPA PROJECT OFFICER:
Mr. Fred Bishop
Washington Pilot Plant
5000 Overlook Ave., S.W.
Washington, D.C. 20032

Project Site: Washington, D.C.

DESCRIPTION OF PROJECT

Award Date: Sept. 26, 1969 **Project Cost:** $1,373,761

Completion Date: Sept. 26, 1972 **Federal Cost:** $1,373,761

Summary: The Environmental Protection Agency and the District of Columbia in a joint research effort are conducting special pilot plant studies to provide process selection and design information for new treatment facilities at the District of Columbia Water Pollution Control Plant. The District plans two major expansions: the first to a 309 MGD plant, the second to a 420 MGD plant. The District needs to select a treatment system which will meet the pollutant discharge standards proposed in the recent Enforcement Conference on the Potomac River, to complete the installation of the 309 MGD plant by late 1972, and to ultimately construct the 420 MGD plant on currently available land.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010EZQ

TITLE OF PROJECT: **"Evaluation of Odor Control by Covering a Sludge Thickener with a Styrofoam Dome"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Metropolitan St. Louis Sewer District 10 East Grand Avenue St. Louis, Missouri 63147	Dr. Alfred A. Bacher Municipal Technology Branch Environmental Protection Agency Washington, D. C. 20460

Project Site: St. Louis, Missouri

DESCRIPTION OF PROJECT

Award Date: 3/19/68

Completion Date: 9/1/71

Project Cost: $32,123

Federal Cost: $24,092

Summary:

This project consists of construction of a styrofoam done over an existing sludge thickener and associated studies to determine optimum methods for controlling odors emitted from the sludge thickener. Various methods of odor control will be investigated, including the injection of oxidants such as chlorine and ozone into the off gas and passing the off gas through an activated carbon trap. The referenced sludge thickener is located in a highly populated area and is a source of odor and nuisance around the sewage treatment plant and the adjacent residential area.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1010 EZT

TITLE OF PROJECT: "Contact Stabilization Operating Parameters"

GRANTEE OR CONTRACTOR:
San Antonio River Authority
430 Three A Life Building
San Antonio, Texas 78205

EPA PROJECT OFFICER:
Mr. George Putnicki
Region VI
Envrionmental Protection Agency
1600 Patterson Street
Suite 1100
Dallas, Texas 75202

Project Site: San Antonio River Basin

DESCRIPTION OF PROJECT

Award Date: 3/29/68

Project Cost: $25,900

Completion Date: 1/1/70

Federal Cost: $19,414

Summary:

The San Antonio River Authority will analyze twelve operating contact stablilization package plants to determine the operating variables essential for effective treatment and develop and Operator's Guide for this type of plant. The Guide will also be helpful to State and local governments as an aid to resolve various waste treatment problems with the use of this type of package plant.

The data obtained from this study will augment the work being conducted by the National Sanitation Foundation, who is developing criteria with which to determine the efficiency of contact stabilization package plants.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 EZX

TITLE OF PROJECT: "The Use of Fly Ash Filter Aid for Sewage Solids Dewatering and Disposal"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Cedar Rapids, Iowa City Hall Cedar Rapids, Iowa 52401	Mr. Ralph Christensen Region V Environmental Protection Agency 1. N. W. Wacker Drive Chicago, Illinois 60606

Project Site: Cedar Rapids, Iowa

DESCRIPTION OF PROJECT

Award Date: 3-29-69	Project Cost: $523,500
Completion Date: 11/30/72	Federal Cost: $392,700

Summary:

The project will demonstrate the use of fly ash from a nearby power plant as a filter aid used to dewater sludges. Pilot plant tests indicate the due to the nature of the sludge from the trickling filter plant other alternate methods of pretreatment would incur severe economic penalties. On the other hand the chemical ingredients in the fly ash, which is obtained at no cost, permits adequate dewatering at minimum cost. In addition, the trace minerals in the fly ash and the plant food value from the sludge constitutes a useable soil conditioner. The City of Cedar Rapids plans to utilize this sludge as a soil conditioner and fertilizer in their parks.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 FAC

TITLE OF PROJECT: "Aerobic Digestion of Sewage Sludge with Effluent Disposal by an Ocean Outfall"

GRANTEE OR CONTRACTOR:
City of Hollywood, Florida

EPA PROJECT OFFICER:
Ed Lomasney
EPA, Region V
1421 Peachtree St. N.E.
Suite 300
Atlanta, Georgia 30309

Project Site: Sewage Treatment Plant
Hollywood, Florida

DESCRIPTION OF PROJECT

Award Date: April 11, 1968

Project Cost: $594,320

Completion Date: Dec. 31, 1972

Federal Cost: $300,000

Summary: The project will demonstrate and evaluate aerobic digestion in surface aerated tanks to reduce the sludge volume and the odor of domestic sewage sludges, polyelectrolytic coagulation of raw domestic sewage, and ocean disposal of settled sewage. A nutrient mass balance will be determined on the aerobic digestion and coagulation processes. Total organic carbon will be used as an expedient process control parameter. Mathematical parameters will be established for the ocean diffusion models on waters characteristic of the Florida coast.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 FDI (14-12-935)

TITLE OF PROJECT: "A Study of the Feasibility of Flow Smoothing Stations in Municipal Sewage Systems"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Research Triangle Institute	James Kreissl
P.O. Box 12194	National Environmental Research Center, AWTRL
Research Triangle Park, N.C.	Cincinnati, Ohio 45268

Project Site: Research Triangle Park, N.C.

DESCRIPTION OF PROJECT

Award Date: Dec. 1, 1970	Project Cost: $23,137
Completion Date: Oct. 31, 1971	Federal Cost: $23,137

Summary: The objective of this project is to determine technical and economic feasibility of use of equalization tanks in sewer systems to increase capacity, establish guidelines for station locations, and develop a predictive model for such systems.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11010 FLQ

TITLE OF PROJECT: "Phosphorus Removal with Pickle Liquor in a 115 MGD Activated Sludge Plant"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Sewerage Commission of the City of Milwaukee P. O. Box 2079 Milwaukee, Wisconsin	Dr. R. L. Bunch National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Milwaukee, Wisconsin

DESCRIPTION OF PROJECT

Award Date: January 7, 1970	Project Cost: $64,553
Completion Date: January 4, 1971	Federal Cost: $46,376

Summary: This is a one year study to determine the long term effects of iron addition on phosphorus removal. Performance of the 115 MGD Jones Island East Plant with iron addition will be compared to performance of the 85 MGD West Plant without iron addition. The effects of iron addition upon mixed liquor flora, mixed liquor settleability, waste sludge conditioning requirements and plant physical facilities will be evaluated along with effluent phosphorus and iron concentrations. It is planned to feed ferrous iron (as waste pickle liquor) to the mixed liquor feed channel of the 115 MGD East Plant. Twenty-four hour composite samples of East and West Plant effluents will be analyzed to determine the ability of ferrous iron to increase phosphorus removal. Microscopic examinations of mixed liquor samples will be conducted to determine if iron affected the mixed liquor culture. A one year test period will establish the feasibility of iron addition as a method of sewage phosphorus removal.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11010 FMY

TITLE OF PROJECT: "Engineering Feasibility Demonstration Study for Muskegon County, Michigan, Wastewater Treatment-Irrigation System"

GRANTEE OR CONTRACTOR:
Muskegon Dpt. of Public Works
County Building
Muskegon, Michigan 49440

EPA PROJECT OFFICER:
James Basilico
Environmental Protection Agency
Washington, D.C. 20460

Project Site: Muskegon, Michigan

DESCRIPTION OF PROJECT

Award Date: Jan. 15, 1970

Project Cost: $55,000

Completion Date: Sept. 15, 1970

Federal Cost: $52,250

Summary: To investigate the feasibility of a lagoon treatment-spray irrigation system for combined domestic wastes and industrial wastewaters in Muskegon County, Muskegon. Various aspects investigated included: (1) sampling and analyses of wastewaters for a variety of parameters, (2) a review of available information concerning the effect of trace elements on soils and crops, (3) laboratory tests of the treatability of the combined wastewaters by lagoon treatment, (4) development of a simulated model to assist in analyzing the volume and water quality aspects of a treated wastewater storage lagoon, (5) soils and groundwater field and office studies regarding the management of groundwater levels to ensure an adequate aerobic treatment zone in the soil as well as to prevent ponding in the site area, and (6) investigations of certain agricultural aspects in using treated wastewaters for spray irrigation.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 FRN

TITLE OF PROJECT: "System for Aeration Process Using Pure Oxygen at Blue Plains Pilot Plant"

GRANTEE OR CONTRACTOR:
Union Carbide Corp.
Linde Division
Tonawanda, N. Y. 14150

EPA PROJECT OFFICER:
D. F. Bishop, Chief
Washington Pilot Plant
5000 Overlook Ave., S.W.
Washington, D.C. 20032

Project Site: Blue Plains Pilot Plant, Washington, D.C.

DESCRIPTION OF PROJECT

Award Date:	Feb. 13, 1970	Project Cost:	$55,900
Completion Date:	Aug. 13	Federal Cost:	$55,900

Summary: This contract is for the necessary personnel, facilities, and equipment to modify the Blue Plains Pilot Plant and conversion of this unit to demonstrate, test and evaluate the Union Carbide Corporation Oxygenation System. Provides for purchase and delivery of equipment, engineering supervision for installation and erection and during check-out and start-up, operating instructions, storage tank and liquid oxygen for six month's operation, monitoring and analyzing and reducing the performance data.

ADDRESS INQUIRIES TO EPA PROJECT OFFICES

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 FRQ

TITLE OF PROJECT: "Hatfield Township Advanced Waste Treatment Facility"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hatfield Township Municipal Authority Colmar, Pennsylvania 18915	Edwin F. Barth National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Colmar, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: April 13, 1971	**Project Cost:** $169,170
Completion Date: Dec. 31, 1972	**Federal Cost:** $126,878

Summary: This project will provide for demonstration, analysis and evaluation of the Hatfield Township advanced waste treatment facility at Hatfield Township, Colmar Pennsylvania. The project objectives include evaluation and demonstration of advanced waste treatment processes on combined municipal-industrial wastewater. The treatment system, which will provide a high degree of phosphorus, 5-day BOD and suspended solids removal, includes flow equalization, lime treatment, biological nitrification and mixed media filtration. Sludge processing will be by gravity thickening, vacuum filtration, and multi-hearth incineration. This project will encompass six months of start-up after completion of construction, twelve months of demonstration, and six months of evaluation. The treatment plant will have a capacity of 3.6 MGD. Data obtained from this project will be used to support design of other advanced waste treatment facilities throughout the Delaware River Basin.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 FVO

TITLE OF PROJECT: "An Advanced Physical-Chemical Wastewater Treatment Process for Housing and Community Development Industries"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Levitt and Sons, Inc.	I. J. Kugelman
Subs. of International Telephone and Telegraph	National Environmental Research Center, AWTRL
	Environmental Protection Agency
Lake Success, New York 11040	Cincinnati, Ohio 45268

Project Site: Englishtown, New Jersey

DESCRIPTION OF PROJECT

Award Date: Oct 29, 1971	Project Cost: $725,510
Completion Date: June 15, 1973	Federal Cost: $250,000

Summary: The objective of this project is to demonstrate the performance, economics, and applicability of a physical-chemical domestic wastewater treatment system designed to provide varying high quality discharges for isolated or developing communities having an average wastewater flow in the 25,000 to 500,000 gpd range.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 FWG 14-12-944

TITLE OF PROJECT: "Feasibility Study on In-Sewer Treatment Methods for BOD Reduction"

GRANTEE OR CONTRACTOR:
Pomercy, Johnson and Bailey
660 South Fair Oaks Avenue
Pasadena, California 91105

EPA PROJECT OFFICER:
Gerald Stern
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Pasadena, California

DESCRIPTION OF PROJECT

Award Date: Sept. 23, 1970 **Project Cost:** $69,525

Completion Date: Sept. 23, 1971 **Federal Cost:** $69,525

Summary: To conduct a feasibility study of in-sewer treatment for BOD removal and possible reduction of downstream treatment processes. Desktop feasibility studies of approximately 10 possible approaches and aeration methods are to be considered. Laboratory studies include an investigation of the rates and mechanisms of chemical and biochemical reactions between oxygen and sulfide in sewage, and studies on a recirculating filled-pipe appartus.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GAK

TITLE OF PROJECT: "Wastewater Reclamation at St. Croix, U.S. Virgin Islands"

GRANTEE OR CONTRACTOR:
Government of U.S. Virgin Islands
Charlotte Amalie
St. Thomas, Virgin Islands 00801

EPA PROJECT OFFICER:
Edmond P. Lomasney
1421 Peachtree St. N.E.
Suite 300
Atlanta, Georgia 30309

Project Site: Krause Lagoon Area, St. Croix

DESCRIPTION OF PROJECT

Award Date: Nov. 19, 1970 Project Cost: $782,942

Completion Date: Sept. 30, 1972 Federal Cost: $472,069

Summary: The objective of this project is to demonstrate and evaluate the effects of groundwater recharge, by use of reclaimed wastewater, on underground water supplies. The project will include a .5 MGD wastewater reclamation plant that will supply renovated wastewater to a groundwater recharge area. Recharge will be accomplished by surface spreading. The proposed reclamation plant will include primary clarification, activated sludge, mixed media filtration, chlorination and aerobic sludge digestion.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: **11010 GEV**

TITLE OF PROJECT: **"Demonstration of the Pure Oxygen Aeration Process to Upgrade Existing Waste Treatment Plants"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
New York City Department of Water Resources 40 Worth Street New York, New York 10013	Mr. Richard C. Brenner National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

Project Site:
Newtown Creek Water Pollution Control Plant, Brooklyn, N. Y. 11222

DESCRIPTION OF PROJECT

Award Date: 6/30/70	Project Cost: $2,421,335
Completion Date: 12/31/72	Federal Cost: $1,500,000

Summary:

This project will convert one of the aeration bays at the Newtown Creek Pollution Control Plant of the New York City Municipal waste treatment system to a pure oxygen aeration process, and demonstrate performance of that system. Project objectives include verifying the applicability of refitting overloaded or high rate waste treatment facilities with an oxygen aeration unit to improve plant performance without new investment in additional aeration tank capacity. Treatment performance of the oxygenation system will be evaluated by measurement of BOD, COD, TSS, Vss, ammonia-N, total Kjeldahl nitrogen, total phosphorous, and ortho phosphate in both feed and effluent wastewater. Nitrification will be examined and the applicability of mineral addition to the oxygenation system as a means of phosphate removal will be evaluated. The plan of operation following conversion includes a twelve month operating period during which the oxygenation system will be operated at progressively higher influent rates, beginning at low capacity initially and running up through present aeration bay capacity and the point of system performance breakdown. Effects of diurnal flow variation will be examined at the design throughput. Phosphate removal via mineral addition will occur near the midpoint of the program and last for about four months. Design capacity is 20 MGD.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GFS

TITLE OF PROJECT: "Muskegon County, Michigan Wastewater Management System"

GRANTEE OR CONTRACTOR:
Muskegon County Dept., of Public Works
County Building
Muskegon, Michigan 49440

EPA PROJECT OFFICER:
Clifford Risley
1 N.W. Wacker Drive
Chicago, Illinois 60606

Project Site: Muskegon County, Michigan

DESCRIPTION OF PROJECT

Award Date: Sept. 1, 1970

Project Cost: $1,445,000

Completion Date: Dec. 31, 1977

Federal Cost: $1,083,750

Summary: This project is to demonstrate a wastewater management system for Muskegon County, Michigan. The system will handle combined municipal and industrial wastewater flows totaling about 32 MGD. The management system is comprised of primary treatment at several collection points, transmission to a central point for treatment in oxidation lagoons, long-term surface storage, disinfection facilities, and wastewater irrigation of 10,000 acres of marginal land for nutrient removal. Water movement in the irrigation area will be completely controlled with a network of wells, tile drainage lines and ditches. Two aerated lagoons of [illegible]0 and 30 acres with a depth of 10 feet each are proposed. There would also be two storage lagoons, each approximately 600 acres in surface area with a working water depth of 10 feet. The purpose of the storage lagoons is to provide for storage of wastewaters during periods when irrigation cannot be performed, provide additional treatment and provide sufficient volume for the storage and treatment of solids. The irrigation system will include rotating irrigation machines that pivot about a central point and have a radii between 1,000 and 2,000 feet. This irrigation system will use low pressure, downward projecting nozzles. The agricultural production phase of the project will permit an evaluation of the potential economic benefit of using treated wastewater to grow marketable crops on a large scale production basis. This project will test the resource recovery potential of this concept at the scale operation required for attaining necessary efficiencies of scale in commercial agricultural production.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GIT

TITLE OF PROJECT: "Transportable Advanced Wastewater Treatment Plant for Interim Use"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
County of Fairfax, Virginia Department of Public Works Fairfax, Virginia 22030	Patrick M. Tobin Municipal Pollution Control Section Environmental Protection Agency Washington, D.C. 20460

Project Site: Fairfax County, Virginia

DESCRIPTION OF PROJECT

Award Date: July 8, 1970	**Project Cost:** $146,000
Completion Date: July 5, 1972	**Federal Cost:** $ 97,820

Summary: The objective of this project is to fabricate (following designs prepared by separate Federal Water Quality Administration contract) a transportable Advanced Waste Treatment plant of approximately 100,000 GPD capacity at a site receiving municipal wastes in Fairfax County, Virginia on Long Branch, as an interim facility capable of meeting the Potomac River Enforcement Conference Recommendations for Zone 1 to 1980. The facility will be operated for a period of 12 months to evaluate its dependability, efficiency, operational characteristics, and its economics. Following completion of the evaluation phase, a report will be prepared which will include recommendations for any necessary design modifications, a phasing plan for subsequent use of the facility at other sites in Fairfax County and the preparation of a concise operator's manual.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GNM

TITLE OF PROJECT: "El Lago Advanced Waste Treatment Facility"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Harris County Water Control & Improvement District No. 50 Seabrook, Texas	Edwin F. Barth National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 42568

Project Site: El Lago, Texas

DESCRIPTION OF PROJECT

Award Date: March 29, 1971	Project Cost: $498,738
Completion Date: Aug. 14, 1973	Federal Cost: $373,304

Summary: The Harris County Water Control and Improvement District will demonstrate advanced treatment of their wastewater to lead the way to the design of other facilities that discharge into Clear Lake. The basic components of the existing treatment plant will be retained, and phosphorus and nitrogen removal instituted. The small volume of wastewater, 300,000 gpd, is considered ideal for a demonstration project.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11010 GRA (14-12-939)**

TITLE OF PROJECT: **"Design of a Transportable Advanced Wastewater Treatment Plant"**

GRANTEE OR CONTRACTOR:

Roy F. Weston
Lewis Lane
West Chester, Pennsylvania 19380
Project Site:
West Chester, Pennsylvania

EPA PROJECT OFFICER:

Mr. Charles E. Myers
Municipal Technology Branch
Environmental Protection Agency
Washington, D. C. 20460

DESCRIPTION OF PROJECT

Award Date: **8/24/70**

Completion Date: **9/23/70**

Project Cost: **$58,997**

Federal Cost: **$58,997**

Summary:

It is generally agreed that the purposes of water pollution control are best served by regionalization of waste treatment facilities. However, the FWQA foresees a need for transportable wastewater treatment plants as temporary installations for: (a) subdivisions where connection with a regional system would overload the existing plant or where the existing plant is already overloaded; (b) small towns and isolated Federal installations, industrial plants, resorts, schools, hospitals, etc., which will later tie-in to a regional system but such regional system is not currently available. The contractor shall furnish the necessary personnel, facilities, and equipment producing the detailed engineering design and specifications of a transportable advanced wastewater treatment (AWT) plant for the treatment of municipal sewage. The plant will produce an effluent having the following characteristics: BOD and phosphorus removal approximately 97-98%, nitrogen removal approximately 90%.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GUA (68-01-0011)

TITLE OF PROJECT: "Construction and Operation of a Transportable Advanced Wastewater Treatment Plant"

GRANTEE OR CONTRACTOR:
Roy F. Weston
1426 Lewis Lane
West Chester, Penn. 19380

EPA PROJECT OFFICER:
Patrick M. Tobin
Environmental Protection Agency
Washington, D.C. 20460

Project Site: Newington, Fairfax County, Virginia

DESCRIPTION OF PROJECT

Award Date: Dec. 28, 1970

Project Cost: $271,937

Completion Date: Nov. 23, 1971

Federal Cost: $271,937

Summary: The objective of this project is to construct and place in operation a transportable advanced wastewater treatment plant.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract) *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GUR (14-12-940)

TITLE OF PROJECT: "Design of a Transportable Advanced Wastewater Treatment Plant"

GRANTEE OR CONTRACTOR:
Burns and Roe, Inc.
700 Kinderkamack Road
Oradell, New Jersey 07649

EPA PROJECT OFFICER:
Charles E. Myers
Environmental Protection Agency
Washington, D.C. 20460

Project Site: Oradell, New Jersey

DESCRIPTION OF PROJECT

Award Date: August 24, 1970 Project Cost: $39,125

Completion Date: Oct. 23, 1970 Federal Cost: $39,125

Summary: It is generally agreed that the purposes of water pollution control are best served by regionalization of waste treatment facilities. However, the FWQA foresees a need for transportable wastewater treatment plants as temporary installations for: (a) subdivisions where connection with a regional system would overload the existing plant or where the existing plant is already overloaded; (b) small towns and isolated Federal installations, industrial plants, resorts, schools, hospitals, etc., which will later tie-in to a regional system but such regional system is not currently available. The contractor shall furnish the necessary personnel, facilities, and equipment for producing the detailed engineering design and specifications of a transportable advanced wastewater treatment (AWT) plant for the treatment of municipal sewage. The plant will produce an effluent having the following characteristics: BOD and phosphorus removal approximately 97-98%, nitrogen removal approximately 90%.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 GUS (14-12-938)

TITLE OF PROJECT: "Design of a Transportable Advanced Wastewater Treatment Plant"

GRANTEE OR CONTRACTOR:
Northwest Laboratories
Battelle Memorial Institute
P.O. Box 999
Richland, Washington 99352

EPA PROJECT OFFICER:
Charles E. Myers
Environmental Protection Agency
Washington, D.C. 20460

Project Site: Richland, Washington

DESCRIPTION OF PROJECT

Award Date: August 24, 1970

Project Cost: $30,000

Completion Date: Oct. 23, 1970

Federal Cost: $30,000

Summary: It is generally agreed that the purposes of water pollution control are best served by regionalization of waste treatment facilities. However, the FWQA foresees a need for transportable wastewater treatment plants as temporary installations for: (a) subdivisions where connection with a regional system would overload the existing plant or where the existing plant is already overloaded; (b) small towns and isolated Federal installations, industrial plants, resorts, schools, hospitals, etc., which will later tie-in to a regional system but such regional system is not currently available. The contractor shall furnish the necessary personnel, facilities, and equipment for producing the detailed engineering design and specifications of a transportable advanced wastewater treatment (AWT) plant for the treatment of municipal sewage. The plant will produce aneffluent having the following characteristics: BOD and phosphorus removal approximately 97-98%, nitrogen removal approximately 90%.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11010 GVT

TITLE OF PROJECT: "Demonstration and Pilot Plant Program for Secondary and Advanced Waste Treatment"

GRANTEE OR CONTRACTOR:
Metropolitan St. Louis Sewer District
2000 Hampton Avenue
St. Louis Missouri 63139

EPA PROJECT OFFICER:
Edwin F. Barth
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: St. Louis, Missouri

DESCRIPTION OF PROJECT

Award Date: April 29, 1971

Project Cost: $1,079,100

Completion Date: Dec. 31, 1972

Federal Cost: $ 208,800

Summary: The objectives of the demonstration and pilot plant program are as follows: (1) to demonstrate and compare the effectiveness and relative costs of various physical-chemical and biological oxidation processes for secondary and advanced wastewater treatment at the Bissell Point and LeMay treatment plants of the Metropolitan St. Louis Sewer District; (2) to demonstrate modifications and methods of operation of the treatment processes necessary to handle: (a) an unusually weak combined wastewater at the LeMay plant, and (b) a strong industrial-domestic mixed wastewater at the Bissell Point Plant; (3) to demonstrate certain advanced waste treatment techniques on these wastewaters, including phosphate removal; (4) to test and demonstrate new process variations (such as deep tank aeration) which would result in substantial savings in capital and operating costs in the full scale plant program, if successful; (5) to determine operating parameters and criteria for use in full scale design; and (6) to operate certain treatment processes at substantial scale through the use of existing plant facilities.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11010 GWI**

TITLE OF PROJECT: **"Advanced Maintenance Management Program"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
County of Fairfax, Virginia Department of Public Works Fairfax, Virginia	Mr. Royal Thayer Environmental Protection Agency Washington, D. C. 20460

Project Site:
Fairfax County, Virginia

DESCRIPTION OF PROJECT

Award Date: 3/11/71	Project Cost: $41,949
Completion Date: 6/15/72	Federal Cost: $39,851

Summary: This project will develop an Advanced Maintenance Management Program for secondary sewage treatment plants which when installed at the Lower Potomac Pollution Plant, Fairfax County, Virginia, will demonstrate to other municipalities operating similar plants a maintenance management program which will: (1) establish, an equipment configuration list; (2) organize, simplify and schedule preventive maintenance actions; (3) establish feedback and recording systems for maintenance and repairs; (4) determine personnel skill and manpower requirements; (5) standardize maintenance training; (6) reduce breakdowns; (7) control maintenance costs; (8) extend equipment life; (9) maximize the availability of overall plant to meet its design goals; (10) optimize use of available manpower resources; and (11) increase overall efficiency of the plant. The project will be conducted in two phases. The Advanced Maintenance Management Program, in manual type format; containing equipment fonfiguration lists, maintenance procedure cards, schedules (weekly, monthly, quarterly and annual), and maintenance feedback and reporting procedures will be developed and the Program installed during the first phase. During the second phase the installed program will be monitored, evaluated, corrections implemented and a final report of the Project for national distribution will be prepared. Phase I will be accomplished in 16 weeks and Phase II evaluation will cover a 12 month period.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11010 GXJ

TITLE OF PROJECT: "Demonstration of Waste Flow Reduction from Households"

GRANTEE OR CONTRACTOR:
General Dynamics
Electric Boat Division
Eastern Point Road
Groton, Connecticut 06340

EPA PROJECT OFFICER:
Mr. Harry Bostian
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site:
Groton, Connecticut

DESCRIPTION OF PROJECT

Award Date: 2/24/71

Project Cost: $51,312

Completion Date: 2/24/73

Federal Cost: $51,312

Summary:

The objective of this project is to obtain data on installation and operation of household water-saving devices, with a view toward future water-conservation campaigns and possible water-conservation legislation.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 HIR

TITLE OF PROJECT: "Lake Restoration by Phosphorus Control"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Ely, Minnesota City Hall Ely, Minnesota 55731	Robert Brice Ely Field Station 222 West Conan Street Ely, Minnesota 55731

Project Site: Wastewater Treatment
Plant, Ely, Minnesota

DESCRIPTION OF PROJECT

Award Date: May 31, 1971	Project Cost: $2,772,358
Completion Date: July 31, 1975	Federal Cost: $2,572,358

Summary: There are six primary objectives in this project: (a) Construct tertiary wastewater treatment facilities which will enable the typical high-rate trickling filter plant at Ely, Minnesota, to obtain the very high degree of phosphorus removal which is postulated to be necessary to reclaim Shagawa Lake from its present state of advanced eutrophy. The concentration of total phosphorus in the effluent being sought is 0.05 mg/l as P, or less; (b) demonstrate that tertiary wastewater treatment facilities so constructed in (a) are capable of upgrading effluent quality normally associated with high-rate trickling filters to meet effluent BOD and suspended solids standards designated by State of Minnesota as acceptable secondary treatment. The suggested standards which will apply to Ely's effluent discharge are 25 mg/l BOD_5 and 30 mg/l suspended solids: (b) begin construction of tertiary wastewater treatment facilities not ready for "start-up" and "shake-down" by May 31, 1972: (c) to repair and restore the existing conventional wastewater treatment facilities at Ely to a high level of operability and reliability by July 31, 1972: (d) to provide facilities to return to the headworks of the existing Ely treatment plant for subsequent treatment the maximum practicable runoff which drains into a channel known as "Stinky Ditch" from adjacent hillsides and which now flows untreated into Shagawa Lake: and (e) to operate the combined wastewater treatment complex to a high degree of efficiency with maximum practicable removal of phosphorus, BOD, and suspended solids for a continuous period of three years commencing on or around August 1, 1972, while concurrent restoration studies are conducted on Shagawa Lake by the NERC of the Environmental Protection Agency.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 HKJ (68-01-0107)

TITLE OF PROJECT: "Development of Procedure Manual for Evaluating the Performance of Waste Treatment Plants"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
URS Research Company 155 Bovet Road San Mateo, California 94402	Lehn Potter Office of Water Programs Environmental Protection Agency Washington, D.C. 20460

Project Site: San Mateo, California

DESCRIPTION OF PROJECT

Award Date: June 8, 1971	Project Cost: $48,246
Completion Date: Dec. 8, 1971	Federal Cost: $48,000

Summary: The objective of this project is to produce a manual to simplify waste treatment plant inspections, efficiency appraisals, and remedial assistance to facilitate uniform plant operating inspections and enable evaluators to compare the effectiveness of various types of facilities.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11010 PCS

TITLE OF PROJECT: "Wastewater Treatment Plant Design Modifications for Eutrophication Control"

GRANTEE OR CONTRACTOR:
City of Ely, Minnesota
City Hall
Ely, Minnesota 55731

EPA PROJECT OFFICER:
Mr. Richard C. Brenner
National Environmental Research
Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site:
Ely, Minnesota

DESCRIPTION OF PROJECT

Award Date: 2/4/71

Completion Date: 5/31/71

Project Cost: $96,975

Federal Cost: $92,125

Summary:

The objectives of this project are threefold:

(1) To develop plans and specifications for tertiary wastewater treatment facilities which will enable a typical high-rate trickling filter plant to obtain the very high degree of phosphorus removal which is postulated to be necessary to restore receiving lake waters that are overfertilized and subject to excessive algal blooms.

(2) To build into the design of the phosphorus removal facilities the capability to upgrade high-rate trickling filter effluents to meet effluent BOD and suspended solids standards designated by the State of Minnesota as acceptable secondary treatment quality.

(3) To develop engineering estimates for construction and operating costs for the proposed facilities.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11050 DEU

TITLE OF PROJECT: "Economical Residential Pressure Sewage System With no Effluent"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Grandview Lake Owners Association	James Kreissl
R. R. #6	National Environmental Research Center
Columbus, Indiana 47201	Environmental Protection Agency
	Cincinnati, Ohio 45268

Project Site: Columbus, Indiana

DESCRIPTION OF PROJECT

Award Date: May 8, 1969 **Project Cost:** $134,805

Completion Date: March 31, 1970 **Federal Cost:** $99,141

Summary: (1) To demonstrate that septic tank effluent can be treated by a combined anaerobic and aerobic lagoon without objectionable odors and show that the lagoon effluents containing nutrients can be converted to vegetation at reasonable costs.

(2) Provide a community pressure sewer system that will demonstrate: The volumetric reduction advantage in a tight pressure sewage system; the cost advantage of plastic pipe sewerage system, maintenance and power cost of grinding and pumping units by individual users.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as* *amended.*

PROJECT NUMBER: **11050** FKE 14-12-428

TITLE OF PROJECT: "A Study of Flow Reduction and Treatment of Wastewater"

GRANTEE OR CONTRACTOR:
Electric Boat Division
General Dynamics
Groton, Connecticut 06340

EPA PROJECT OFFICER:
Charles Swanson
National Environmental Research Center, AWTRL
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Groton, Connecticut

DESCRIPTION OF PROJECT

Award Date: Dec. 31, 1968

Project Cost: $98,500

Completion Date: Dec. 31, 1969

Federal Cost: $98,500

Summary: To find practical means of waste flow reduction or waste treatment for the ordinary household. Present water quality and quantity requirements were reviewed to determine the areas where better water and waste management would be most beneficial. Information was obtained from manufacturers of plumbing devices and waste treatment equipment who were surveyed for available water-saving plumbing devices and individual waste treatment units. Literature on advanced wastewater treatment was reviewed for processes that might be applicable for individual home usage.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(2) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11050 FOU

TITLE OF PROJECT: "Pressure Sewer Demonstration"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Borough of Phoenixville 140 Church Street Phoenixville, Pennsylvania 19460 Project Site: Phoenixville, Pennsylvania	Mr. Jim Kreissl National Environmental Research Center, AWTRL Environmental Protection Agency Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: 10/1/70	Project Cost: $115,219
Completion Date: 1/31/72	Federal Cost: $80,142

Summary:

The objective of this project is to demonstrate the feasibility of a pressure sewer system using individual home pump-grinder units. The pump-grinder unit will be installed in each of five homes. The sewage from the homes will be ground and pumped through a common pipe to an existing gravity sewer. The plastic pipe will run about one-half mile and experience a net elevation rise of sixty feet. The system will be evaluated over a six-month period.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

COMBINED SEWER DISCHARGE

STORM SEWER DISCHARGE

NON-SEWERED RUN-OFF

3. A

COMBINED SEWER DISCHARGE
STORM SEWER DISCHARGE
NON-SEWERED RUN-OFF

This program element, combined sewer overflows and storm water discharges, combines three categories of research in municipal pollution control previously defined within the EPA Water Quality Research Program. These are combined sewer overflows, storm sewer discharges, and non-sewered runoff.

Combined sewer overflows and storm sewer discharges constitute a major pollution problem. The Public Health Service (1964) estimated that sewer separation would cost the Nation $20 to $30 billion. There are approximately 36 million people, or about 29 percent of the sewered population, served by combined sewers in roughly 1,329 jurisdictions containing over three million acres.

Combined sewer overflow sources include interceptor relief points, pumping stations, treatment plant bypasses and uregulated overflows. An estimated 53% of the Nation's sewers are subjected to hydraulic overload due to infiltration. The estimated number of overflow points is 14,000 in 641 jurisdictions surveyed. The average annual BOD load from combined sewer overflows is roughly 500 pounds per acre served. This does not include additional loads discharged due to treatment plant upset or flows bypassed at the plant as a result of storm events. The shock loads on receiving waters are large. Pollution caused by excess flows in an average urban area can be as high as eight times that resulting from the dry weather effluent from secondary treatment plants. There is no rational basis for designing combined sewer capacity on the basis of a wet weather to dry weather flow ratio. A median value for such a ratio nationally is about 4 to 1, while it is not uncommon for the combined sewer collection system to deliver 100 times dry weather flow to the interceptor. The shortcomings of such design are obvious. Complete separation of the existing combined sewers would reduce the pollutional load from that source by only about 50 percent.

In 1965, Congress authorized a research, development, and demonstration program to find lesser cost remedial alternatives than separation. The prime thrust so far has been directed to combined sewer overflows, though we have found that storm water discharges carry high pollutant loads (contrary to long-standing beliefs).

Thus far, over 100 projects carried out by means of demonstration grants and contracts have produced much information useful in defining the problem and in the application of remedial techniques related primarily to combined sewer overflows. New hardware has also been developed and is now available to those engaged in planning and constructing remedial works.

PROJECT INDEX

PPB 1102 - Combined Sewer Overflows

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DHQ	Montgomery County, Ohio	C	3-14
DIG	The Western Company	A	3-15
DIH	The Western Company	A	3-16
DNO	FMC Corporation	A	3-17
DNO	FMC Corporation	A	3-18
DSQ	Battelle Memorial Institute	C	3-19
DWF	Underwater Storage, Incorporated	A	3-20
DXH	City of Akron, Ohio	C	3-21
EKD	Lehigh University	D	3-22
EKO	American Society of Civil Engineers	A	3-23
EXV	Fram Corporation	A	3-24
EYD	Hydrospace Research Corporation	C	3-25
EZW	City of Cleveland, Ohio	C	3-26
FAL	City of Columbus, Ohio	A	3-27
FAM	City of Shelbyville, Illinois	C	3-28
FAN	Borough of New Providence, New Jersey	C	3-29
FAQ	Cities of Minneapolis - St. Paul, Minnesota	A	3-30
FAU	City of Milwaukee, Wisconsin	C	3-31
FAV	City of East Chicago, Indiana	C	3-32
FAX	City of Detroit, Michigan	C	3-33
FDC	Rex Chainbelt, Inc.	A	3-34
FKI	Rhodes, Incorporated	A	3-35
GYU	City of Fort Wayne, Indiana	C	3-36
HFR	Onandaga County, New York	C	3-37
HMM	The Franklin Institute Research Laboratory	C	3-38
29-IDA-2	City of Merdian, Idaho	A	3-39

11022	Grantee or Contractor	Project Status*	Page
DEI	Tulane University	A	3-40
DMU	American Public Works Association	A	3-41
DPP	Mel-Labs, Incorporated	A	3-42
DQI	New York State Department of Health	C	3-43
DZU	City of Dallas, Texas	C	3-44
ECV	Karl R. Rohrer Associates	A	3-45
EFF	American Public Works Association	A	3-46
ELK	City of Seattle, Washington	A	3-47
EMD	City of Chicago, Illinois	C	3-48
FLV	City of Richmond, Virginia	C	3-49
FWR	City of Philadelphia, Pennsylvania	C	3-50

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11023	Grantee or Contractor	Project Status*	Page
DAA	Ionics, Incorporated	A	3-51
DME	Metropolitan District Commission, Boston, Massachusetts	C	3-52
DPI	Rand Development Corporation	A	3-53
DSX	City of Rohnert Park, California	C	3-54
DXC	City of San Francisco, California	B	3-55
DZF	American Process Equipment Corporation	A	3-56
EKC	City of Kenosha, Wisconsin	C	3-57
EVO	Crane Company Cochran Division	A	3-58
EYC	Hercules, Incorporated	B	3-59
EYI	Hydrotechnic Corporation	A	3-60
FAO	City of New York, New York	C	3-61
FAR	City of Mt. Clemens, Michigan	C	3-62
FAS	City of New Orleans, Lousiana	C	3-63
FAT	Metropolitan District Commission, Boston, Massachusetts	C	3-64
FAW	City of Dallas, Texas	C	3-65
FDB	Dow Chemical Company	A	3-66
FDD	Cornell, Howland, Hayes & Merryfield	A	3-67
FIX	Roy F. Weston, Incorporated	A	3-68
FIY	City of Chippewa Falls, Wisconsin	C	3-69
FWS	City of Racine, Wisconsin	C	3-70
FWT	City of Philadelphia, Pennsylvania	C	3-71
GSC	City of Lancaster, Pennsylvania	C	3-72
3-ILL-1	City of Springfield, Illinois	A	3-73

11024	Grantee or Contractor	Project Status	Page
DMS	Hayes, Seay, Mattern & Mattern	A	3-74
DOC	Metcalf & Eddy, Incorporated	A	3-75
DOK	Merrimack College	A	3-76
DQU	University of Cincinnati	C	3-77
DZB	American Standard, Incorporated	B	3-78
EBI	Water Resources Engineers, Incorporated	A	3-79
EBJ	University of Florida	A	3-80
ELB	Black, Crow & Eidsness	A	3-81
EQE	Southwest Research Institute	A	3-82
EQG	Metcalf & Eddy, Incorporated	A	3-83
EVQ	City of Milwaukee, Wisconsin	C	3-84
EXF	Roy F. Weston, Incorporated	A	3-85
EYF	Hittman Associates, Incorporated	C	3-86
FEJ	Henningson, Durham, & Richardson, Inc.	B	3-87
FIU	Anatole J. Sipin Company	B	3-88
FJE	The Franklin Institute Research Laboratory	A	3-89
FKJ	Aerojet - General Corporation	A	3-90
FKM	Aerojet - General Corporation	A	3-91
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FLY	The Western Company	A	3-93
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DNK	Hittman Associates, Incorporated	E	3-95
DSL	City of St. Paul, Minnesota	B	3-96
FLN	City of Urbana, Illinois	C	3-97
HJP	North Carolina State University	C	3-98
68-01-0173	Hittman Associates, Incorporated	B	3-99

11032	Grantee or Contractor	Project Status	Page
DTI	City of LaSalle, Illinois	C	3-100
GQG	Columbia Research Corporation	C	3-101

11034	Grantee or Contractor	Project Status	Page
DUY	The Franklin Institute Research Lab	A	3-102
FKL	AVCO - Economics Systems Corporation	A	3-103
FLU	University of Minnesota	A	3-104
FUJ	URS Research Company	B	3-105

PPB 1104 - Non Sewered Runoff

11040	Grantee or Contractor	Project Status	Page
DRS	University of Michigan	C	3-106
GYJ	Biospherics, Incorporated	C	3-107

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

FINAL REPORTS AVAILABLE

PPB 1102 - Combined Sewer Overflows

Report Number	Title/Author	Source
11020---09/67	Demonstrate the Feasibility of the Use of Ultrasonic Filtration in Treating the Overflows from Combined and/or Storm Sewers; by Acoustica Assoc., Inc., Los Angeles, Calif.	NTIS - PB 201 745
11020---12/67	Problems of Combined Sewer Facilities and Overflows - 1967; by American Public Works Association	GPO - $1.00
11020---05/68	Feasibility of a Stabilization-Retention Basin in Lake Erie at Cleveland, Ohio; by Havens and Emerson , Cleveland, Ohio	NTIS - PB 195 083
11020---06/69	Reduction in Infiltration by Zone Pumping; by Hoffman and Fiske, Lewiston, Idaho	NTIS - PB 187 868
11020---10/69	Crazed Resin Filtration of Combined Sewer Overflows; by Hercules, Inc., Wilmington, Delaware	NTIS - PB 187 867
11020---03/70	Combined Sewer Overflow Seminar Papers; by Storm and Combined Sewer Pollution Control Branch, Division of Applied Science and Technology, FWQA, Washington, D.C.	NTIS - PB 199 361
11020---02/71	Deep Tunnels in Hard Rock; by College of Applied Science and Engineering and Univ. Extension, Univ. of Wisconsin, Milwaukee, Wisconsin	GPO - $1.75
11020DES06/69	Selected Urban Storm Water Runoff Abstracts; by The Franklin Institute, Phil., Pa.	NTIS - PB 185 314
11020DGZ10/69	Design of a Combined Sewer Fluidic Regulator; by Bowles Engineering Corp., Silver Spring, Maryland	NTIS - PB 188 914
11020DIG08/69	Polymers for Sewer Flow Control; by The Western Co., Richardson, Texas	NTIS - BP 185 951
11020DIH06/69	Improved Sealants for Infiltration Control; by The Western Company, Richardson, Texas	GPO - $1.25

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Report Number	Title/Author	Source
11020DNO08/67	Feasibility of a Periodic Flushing System for Combined Sewer Cleansing; by FMC Corp., Santa Clara, California	NTIS - PB 195 223
11020DNO03/72	A Flushing System for Combined Sewer Cleansing; by FMC Corp., Santa Clara, Calif.	GPO - $1.75
11020DWF12/69	Control of Pollution by Underwater Storage; by Underwater Storage, Inc., - Silver Schwartz, Ltd., Washington, D.C.	GPO - $1.75
11020EKO10/69	Combined Sewer Separation Using Pressure Sewers; by American Society of Civil Engineers, Cambridge, Massachusetts	NTIS - PB 188 511
11020EXV07/69	Strainer/Filter Treatment of Combined Sewer Overflows; by Fram Corporation	NTIS - PB 185 949
11020FAL03/71	Evaluation of Storm Standby Tanks, Columbus, Ohio; by Dodson, Kinney & Lindblom, Columbus, Ohio	GPO - $1.50
11020FAQ03/71	Dispatching System for Control of Combined Sewer Losses; by Metro. Sewer Board, St. Paul Minnesota	GOP - $1.75
11020FDC01/72	Screening/Flotation Treatment of Combined Sewer Overflows by Rex Chainbelt, Inc., The Ecology Division, Milwaukee, Wisc.	GPO - $1.50
11020FKI01/70	Dissolved-Air Flotation Treatment of Combined Sewer Overflows; by Rhodes Corp., Oklahoma City, Oklahoma	NTIS - PB 189 775
11022DEI05/72	Sewer Bedding and Infiltration - Gulf Coast Area; by Tulane University, New Orleans, La.	GPO - $1.50
11022DMU07/70	Combined Sewer Regulator Overflow Facilities; by American Public Works Association, Chicago, Illinois	GPO - $1.50
11022DMU08/70	Combined Sewer Regulation and Management - A Manual of Practice; by American Public Works Association, Chicago, Illinois	GPO - $1.50
11022DPP10/70	Combined Sewer Temporary Underwater Storage Facility; by Melpar, Falls Church, Va.	GPO - $1.75

Report Number	Title/Author	Source
11022ECV09/71	Underwater Storage of Combined Sewer Overflows; by Karl R. Rohrer Associates, Inc., Akron, Ohio	GPO - $1.50
11022EFF12/70	Control of Infiltration and Inflow Into Sewer Systems; by American Public Works Association, Chicago, Ill.	GPO - $1.25
11022EFF01/71	Prevention and Correction of Excessive Infiltration and Inflow Into Sewer Systems - A Manual of Practice; by American Public Works Asso., Chicago, Ill.	GPO - $1.25
11022ELK12/71	Maximizing Storage in Combined Sewer Systems; by Municipality of Metropolitan Seattle, Wash.	GPO - $1.75
11023---08/70	Retention Basin Control of Combined Sewer Overflows; by Springfield Sanitary District, Springfield, Ill.	GPO - $1.00
11023DAA03/72	Hypochlorite Generator for Treatment of Combined Sewer Overflows; by Ionic, Inc., Watertown, Mass.	GPO - $1.00
11023DPI08/69	Rapid-Flow Filter for Sewer Overflows; by Rand Development Corp., Cleveland, Ohio	NTIS - PB 194 032
11023DZF06/70	Ultrasonic Filtration of Combined Sewer Overflows; by American Process Equipment Corp., Hawthorne, Ca.	GPO - 60¢
11023EVO06/70	Microstraining and Disinfection of Combined Sewer Overflows; by Cochrane Div., Crane Co., King of Prussia, Pa.	GPO - 70¢
11023EYI04/72	High Rate Filtration of Combined Sewer Overflows; by Hydrotechnic Corporation, New York, New York	GPO - $2.50
11023FDB09/70	Chemical Treatment of Combined Sewer Overflows; by Dow Chemical Co., Midland, Mich.	GPO - $1.50
11023FDD03/70	Rotary Vibratory Fine Screening of Combined Sewer Overflows; by Cornell, Howland, Hayes & Merryfield, Corvallis, Ore.	GPO - $1.00
11023FDD07/71	Demonstration of Rotary Screening for Combined Sewer Overflows; by City of Portland, Dept. of Public Works, Portland, Oregon	GPO - 65¢

Report Number	Title/Author	Source
11023FIX08/70	Conceptual Engineering Report-Kingman Lake Project; by Roy F. Weston, West Chester, Pa.	GPO - $1.25
11024---06/70	Combined Sewer Overflow Abatement Technology; by Storm and Combined Sewer Pollution Control Branch, Div. of Applied Science and Technology, FWQA, Washington, D.C.	GPO - $2.50
11024DOC07/71	Storm Water Management Model, Vol. I, Final Report; by Metcalf & Eddy Engineers, Palo Alto, Ca.	GPO - $2.75
11024DOC08/71	Storm Water Management Model, Vol. II, Verification and Testing; by Metcalf & Eddy Engineers, Palo Alto, Ca.	GPO - $1.50
11024DOC09/71	Storm Water Management Model, Vol. III, User's Manual; by Metcalf & Eddy Engineers, Palo Alto, Ca.	GPO - $2.75
11024DOC10/71	Storm Water Management Model, Vol. IV, Program Listing; by Metcalf & Eddy Engineers, Palo Alto, Ca.	GPO - $2.00
11024DOK02/70	Proposed Combined Sewer Control by Electrode Potential; by Merrimack College, Andover, Mass.	NTIS - PB 195 169
11024DMS05/70	Engineering Investigation of Sewer Overflow Problems; by Hayes, Seay, Mattern and Mattern, Roanoke, Va.	GPO - $2.00
11024DQU10/70	Urban Runoff Characteristics; by Univ. of Cincinnati, Cincinnati, Ohio	GPO - $2.75
11024EJC07/70	Selected Urban Storm Water Runoff Abstracts, July 1968-June 1970; by The Franklin Institute Research Laboratories, Philadelphia, Pa.	GPO - $2.75
11024EJC10/70	Selected Urban Storm Water Runoff Abstracts - First Quarterly Issue; by The Franklin Institute Research Laboratories, Philadelphia, Pa.	GPO - 50¢
11024EJC01/71	Selected Urban Storm Water Runoff Abstracts, Second Quarterly Issue; by The Franklin Institute Research Laboratories, Philadelphia, Pa.	GPO - 60¢
11024ELB01/71	Storm and Combined Sewer Pollution Sources and Abatement, Atlanta, Ga.; by Black, Crow and Eidsness, Inc., Atlanta, Ga.	NTIS - PB 201 725

Report Number	Title/Author	Source
11024EQE06/71	Impregnation of Concrete Pipe; by Southwest Research Institute, San Antonio, Texas	GPO - 75¢
11024EQG03/71	Storm Water Problems and Control in Sanitary Sewers, Oakland and Berkeley, California; by Metcalf & Eddy Engineers, Palo Alto, Ca.	GPO - $4.00
11024EXF08/70	Combined Sewer Overflow Abatement Alternatives, Washington, D.C.; by Roy F. Weston, Inc., West Chester, Pa.	GPO - $2.00
11024FJE04/71	Selected Urban Storm Water Runoff Abstracts Third Quarterly Issue; by Franklin Institute Research Laboratories, Philadelphia, Pa.	GPO - 75¢
11024FJE07/71	Selected Urban Storm Water Runoff Abstracts - July 1970-June 1971; by The Franklin Institute Research Lab., Philadelphia, Pa.	GPO - $1.50
11024FKJ10/70	In-Sewer Fixed Screening of Combined Sewer Overflows; by Envirogenics Co., Div. of Aerojet-General Corp., El Monte, Ca.	GPO - $1.25
11024FKN11/69	Stream Pollution and Abatement From Combined Sewer Overflows, Bucyrus, Ohio; by Burgess and Niple, Ltd., Columbus, Ohio	GPO - $2.00
11024FKM12/71	Urban Storm Runoff and Combined Sewer Overflow Pollution, Sacramento, California; by Envirogenics Co., Div. of Aerojet-General Corp., El Monte, Ca.	GPO - $1.75
11024FLY06/71	Heat Shrinkable Tubing as Sewer Pipe Joints; by The Western Co. of North America, Richardson, Texas	GPO - $1.25

PPB 1103 - Storm Sewer Discharges

Report Number	Title/Author	Source
11030DNK08/68	The Beneficial Use of Storm Water; by Hittman Associates, Inc., Baltimore, Md.	NTIS - PB 195 160
11030DNS01/69	Water Pollution Aspects of Urban Runoff; by American Public Works Asso., Chicago, Ill.	GPO - $1.50
11034DUY03/72	Investigation of Porous Pavements for Urban Runoff Control; by The Franklin Institute Research Laboratories, Philadelphia, Pa.	GPO - $1.25
11034FKL07/70	Storm Water Pollution From Urban Land Activity; by AVCO Economic Systems Corp., Washington, D.C.	GPO - $2.50
11034FLU06/71	Hydraulics of Long Vertical Conduits and Associated Cavitation; by Univ. of Minnesota, Minneapolis, Minn.	GPO - 60¢

PPB 1104 - Non Sewered Runoff

Report Number	Title/Author	Source
11040GKK06/71	Environmental Impact of Highway Deicing; by Edison Water Quality Lab., EPA, Edison, N.J.	GPO - $1.25

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DGZ (14-12-486)

TITLE OF PROJECT: "Fluidic Interceptor Study"

GRANTEE OR CONTRACTOR:

Bowles Engineering Corporation
9347 Fraser Street
Silver Spring, Maryland 20910

EPA PROJECT OFFICER:

Mr. Darwin Wright
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Silver Spring, Maryland

DESCRIPTION OF PROJECT

Award Date:	February 4, 1969	Project Cost:	$60,863
Completion Date:	August, 1969	Federal Cost:	$58,891
			1,972 (12/69)
			$60,863

Summary:

This project consisted of the development of a Fluidic Regulator to minimize combined sewer overflow while protecting interceptors from overloading. The device diverts overflows as a function of sewer liquid levels. Installation costs are only slightly more than for conventional diversion structures, while the operation and maintenance are simple and minimal. A Final Report on this project has been published entitled "Design of a Combined Sewer Fluidic Regulator."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DHQ (WPRD 211-01-68)

TITLE OF PROJECT: "Ground Water Infiltration and Sealing of Sewers"

GRANTEE OR CONTRACTOR: Board of County Commissioners Montgomery County Dayton, Ohio 45401	EPA PROJECT OFFICER: Mr. Eugene F. Harris EPA, Region V 4676 Columbia Parkway Cincinnati, Ohio 45226

Project Site: Kettering, Ohio

DESCRIPTION OF PROJECT

Award Date: August 8, 1968	Project Cost: $137,000
Completion Date: March 1972	Federal Cost: $ 96,570

Summary:

This project consists of a demonstration program which will identify the cause and degree of infiltration of surface and ground water into selected sewer sections. After establishing the cause and effects of this surcharging, remedial action will be taken utilizing internal sewer sealing with chemicals and pressure grouting. New techniques for chemical application will be developed as the work progresses. After and during the sealing program, data will be analyzed to establish the most effective and economic technique and material.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1 Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DIG (14-12-34)

TITLE OF PROJECT: "Methods to Reduce Water Pollution Caused by Storm Water Sewers Loading by Using Fluid Flow Friction Reducers"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
The Western Company	Mr Harry C. Torno
2201 N. Waterview Parkway	EPA, Office of R&M
Richardson, Texas 75080	Washington, D.C. 20460

Project Site: Richardson, Texas

DESCRIPTION OF PROJECT

Award Date:	December 30, 1966	**Project Cost:**	$416,464
Completion Date:	May 19, 1969	**Federal Cost:**	$416,464

Summary: Six polymers were investigated to determine their effects on increasing pipe carrying capacity while observing toxicity and effects on sewage treatment. It was found that a maximum flow increase of 240% could be obtained at a constant head. Field tests on a 24-inch line demonstrated surcharges of greater than 6 feet could be eliminated by polymer additions. The polymers were non-toxic to the biota and did not act as a bio-stimulant for algae. The cost of using polymers during peak storm conditions was shown to be one-fifth of that for new construction. A Final Report on this project has been published entitled "Polymers for Sewer Flow Control"

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DIH (14-12-146)

TITLE OF PROJECT: "Development and Demonstration of Materials to Reduce or Elemenate Water Infiltration into Sewerage"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Western Company Research Division 2201 N. Waterview Parkway Richardson, Texas 75080	Mr. George Putnicki EPA, Region VI 1600 Patterson Street Dallas, Texas 75202

Project Site: Richardson, Texas

DESCRIPTION OF PROJECT

Award Date: January 4, 1968	Project Cost: $106,526
Completion Date: May 1969	Federal Cost: $106,526

Summary: This project consisted of the development of new, more effective sealants for sewer line leaks (leaking joints, cracks and large holes). A wide range of candidate materials was surveyed and weaknesses of rejected materials were noted. Specific properties of acceptable materials were ascertained and materials having these properties were identified. These materials were subjected to tests designed to demonstrate their effectiveness as sealants. It was concluded that infiltration adversely influences sewer system operating costs and effectiveness and that leakage repair systems are limited in their effectiveness. Several sealants developed during the program were demonstrated to be able to effect strong; permanent repairs. A Final Report on this project has been published entitled "Improved Sealants for Infiltration Control."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DNO (14-12-19)

TITLE OF PROJECT: "Feasibility of a Periodic Flushing System for Combined Sewer Cleansing"

GRANTEE OR CONTRACTOR:
FMC Corporation
1185 Coleman Avenue
Sante Clara, California 95052

EPA PROJECT OFFICER:
Mr. George Kirkpatrick
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Sante Clara, California

DESCRIPTION OF PROJECT

Award Date: December 28, 1966

Project Cost: $32,371

Completion Date: August 1967

Federal Cost: $31,093
1,278 (3/68)
$32,371

Summary:

This project studied the feasibility of periodic flushing as a means of reducing wet weather pollution. The study included flushing practices, application requirements, hydraulic theory and sampling methods and equipment. Flushing test equipment was designed for Phase II (14-12-466). It was concluded, based on existing information, that flushing would be beneficial. A Final Report on this project has been published entitled "Feasibility of a Periodic Flushing System for Combined Sewer Cleansing."

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1 Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DNO (14-12-466)

TITLE OF PROJECT: "Evaluation of a Periodic Flushing System for Combined Sewer Cleansing"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
FMC Corporation Central Engineering Laboratories 1185 Coleman Avenue Santa Clara, California 95052	Mr. Loren L. Weinbrenner EPA, Region IX 100 California Street San Francisco, California 94111

Project Site: Santa Clara, California

DESCRIPTION OF PROJECT

Award Date: October 9, 1968 Project Cost: $418,862

Completion Date: September 3, 1971 Federal Cost: $418,862

Summary: This project evaluated the use of a periodic flushing operation as a means of maintaining lower levels of deposited materials during low-flow, dry weather periods in combined sewers.

Full scale tests were conducted on two variable-slope test sewers (12 and 18-inch diameters). During the tests, solids were first allowed to build up in both test sewers by passing domestic sewage through the sewers for durations of 12 to 40 hours and then were removed by hydraulic flushing. The results from the tests showed that flush waves generated using flush volumes ranging from 300 to 900 gallons at average release rates ranging from 200 to 3000 gpm were found to remove from 20 to 90 percent of the solids deposited in the 800-foot long test sewers.

A Final Report has been published on this project entitled "A Flushing System for Combined Sewer Cleansing".

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 DSQ (14-12-519)

TITLE OF PROJECT: "Development, Demonstration and Evaluation of Physical-Chemical Treatment of Combined Storm-Sanitary Sewage"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Battelle Memorial Institute Pacific Northwest Laboratory Richland, Washington 99352	Mr. Frank Condon Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Richland, Washington

DESCRIPTION OF PROJECT

Award Date:	June 23, 1969	Project Cost:	$507,810
Completion Date:	June 1972	Federal Cost:	$391,310
Summary:			46,500 (9/71)
			70,000 (3/72)
			$507,810

This project consists of the development, demonstration, and evaluation of the applicability, effectiveness, and economics for physical-chemical method of treating combined sewage. The basic process to be demonstrated utilizes powdered activated carbon adsorption, inorganic coagulation, polyelectrolyte flocculation, sedimentation, and spent carbon regeneration.

Treatment units and process methodology will be specifically designed to meet the constraints of high and widely fluctuating wastewater volumes, widely varying wastewater quality, short detention times, intermittent use, low first cost and economics of operation, and small construction sites. Beginning with bench-scale design experiments, the process will be carried through pilot scale operations and detailed evaluation of the method.

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 DWF (14-12-139)

TITLE OF PROJECT: "Pilot Demonstration Underwater Storage Facility for Storm Water Overflow"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Underwater Storage, Inc. Silver Schwartz, Ltd. Joint Venture Washington, D. C.	Mr. George Kirkpatrick Office of Research & Monitoring Environmental Protection Agency Washington, D. C. 20460

Project Site: Washington, D.C.

DESCRIPTION OF PROJECT

Award Date: December 14, 1967 Project Cost: $658,763

Completion Date: December 1969 Federal Cost: $658,763

Summary:

A pilot plant was designed, constructed and operated to assess the feasibility of providing a facility for the collection, treatment, storage and final disposition of a portion of the storm overflow from a combined sewer system serving a thirty-acre drainage area in Washington, D. C. A Parshall flume was installed in the overflow line for measurement of flow rates and determination of total overflow volume. A portion of the overflow was diverted to the pilot plant through grit chambers and a comminutor. Flow as stored in two 100,000-gallon underwater bags fabricated of nylon reinforced synthetic rubber and fastened to the river bed by a system of patented anchors. During the period of storage, compressed air was delivered to the tanks for agitation of the solids. Following cessation of the storm, contents of the bags were pumped to the interceptor sewer for delivery to the District of Columbia Sewage Treatment Plant at Blue Plains. Flow into and out of each underwater storage tank was metered and recorded. Samples of the combined sewage overflow discharged to the bags and pumped discharge from the bags were collected and subjected to laboratory analyses. During the operation period from January through September 1969, a total of 1,600,000-gallons of diverted overflow from 38-storms was stored in the tanks. In addition, 600,000-gallons of river water was pumped into the underwater storage tanks for testing during dry weather periods. The total amount stored was $341,480 or $1.70 per gallon of storage. The project demonstrated that temporary storage of overflow from combined sewers in underwater rubber storage tanks is feasible and may, under suitable conditions, be effective in eliminating direct, untreated discharge of combined sewage into surface waters during storm periods. A Final Report has been published entitled "Control of Pollution by Underwater Storage."

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 DXH

TITLE OF PROJECT: "Void Space Storage With Treatment and Flow Regulation of Combined Sewer Overflows"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Department of Public Service	Alfred C. Smith
Municipal Building	EPA, Region V
Akron, Ohio 44308	1 N.W. Wacker Drive
	Chicago, Illinois 60606

Project Site: Akron, Ohio

DESCRIPTION OF PROJECT

Award Date: May 23, 1969	Project Cost: $750,000
Completion Date: July 1, 1975	Federal Cost: $562.500

Summary: The project is to construct, operate and evaluate an underground storage/treatment facility for excess combined sewage. The facility will include novel concepts in construction and operation. It will be an excavated hopper shaped cavity lined with an impermeable membrane, filled with an inert material, covered with soil and the surface made useable. Storage will be in the void space of the fill. The treatment of sewage prior to entry to the storage facility will be through tube clarifiers which will also be utilized as flow regulators. A thorough evaluation of operational problems and limits, effectiveness and/or efficiency, cost comparison against standard practices and applicability will be made.

The project will be located adjacent to the Little Cuyahoga River at Tallmadge (Memorial) Parkway in Akron, Ohio.

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5a (2), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 EKD

TITLE OF PROJECT: "Transport of Solid Suspension in Conduits"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Lehigh University Bethleham, Pennsylvania 18015	Mr. Richard Dewling Edison Water Quality Laboratory Edison, New Jersey 08817

Project Site: Bethleham, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: June 19, 1969 Project Cost: $41,095

Completion Date: August 15, 1970 Federal Cost: $37,000

Summary: The objecitves of this two-part project were:

1. To continue the investigation and determination of design criteria for minimum transport velocities of non-depositing solid-liquid mixtures in pipe lines.
2. To further develop a modified Venturi meter to measure mixture flow rate and concentration simultaneously.

The benefits were to include improved design and operation of pressure lines for the transport of ground sanitary sewage. Such pressure lines would be used for combined sewer separation and control of overflows of combined sewage to streams, as developed by the combined sewer separation project of the American Society of Civil Engineers (FWPCA contract no. 14-12-29).

Results of first year's study were inconclusive and further funding was not recommended.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 EKO (14-12-19)

TITLE OF PROJECT: "Feasibility and Development of New Methods of Separating Sanitary Sewage from Combined Sewerage Systems"

GRANTEE OR CONTRACTOR:
American Society of Civil Engs.
347 East 47th Street
New York, New York 10017

EPA PROJECT OFFICER:
Mr. Harry C. Torno
Office of Research and Monitoring
Environmental Protection Agency
Washington, D.C. 20460

Project Site: Cambridge, Massachusetts

DESCRIPTION OF PROJECT

Award Date: November 3, 1966 Project Cost: $347,710

Completion Date: October 1969 Federal Cost: $347,710

Summary: This project concerned the separation of community wastewaters and runoff from rainfall and snowmelt in areas presently served by combined and intercepting sewers. Separation is accomplished by withdrawing the wastewater fraction of flows from existing plumbing systems and passing it through a sequence of added systems components as follows: (1) a storage, grinding and pumping building; (2) pressure tubing fished from the unit through each existing building sewer into the existing combined sewer; and (3) pressure piping inserted in that sewer and extending to the existing intercepting sewers that carry the wastewaters to treatment and disposal works.

The feasibility of storing, grinding and pumping sewage from individual residences has been established; and standard comminuting and pumping equipment will be satisfactory for serving larger buildings. Acceptable types of pressure tubing are available that can be entered by workmen. There are combined sewer areas that can be separated most effectively by a version of the method investigated, but generally pressure systems will cost more than new gravity systems. New capabilities developed appear to be of potentially greater use for applications other than separation, such as new construction including utility corridors, and introduce viable alternatives for design of wastewater sewerage.

A Final Report has been published on this project entitled "Combined Sewer Separation Using Pressure Sewers."

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a 1 Contract *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 EXV (14-12-17)

TITLE OF PROJECT: "Feasibility Investigations of a Self-Cleaning Strainer and a Self-Cleaning Filter"

GRANTEE OR CONTRACTOR:
Fram Corporation
Providence, R. I. 02916

EPA PROJECT OFFICER:
Mr. Francis J. Condon
Environmental Protection Agency
Office of Research and Monitoring
Washington, D.C. 20460

Project Site: Providence, R. I.

DESCRIPTION OF PROJECT

Award Date: December 27, 1967

Project Cost: $32,733

Completion Date: December 1968

Federal Cost: $32,733

Summary: This project was to evaluate the feasibility of a "self-cleaning strainer, self-cleaning filter for treatment of combined sewer overflows. The anticipated goal was to design and construct a prototype system capable of handling up to 1000 gpm with a BOD reduction near 60%, and with the capability of automatic operation in remote locations. It was shown that the strainer model produced consistent SS removals of about 35% under highly varying load conditions, at a flux of 25 gpm/s.f.

A Final Report on this project has been published entitled "Strainer/Filter Treatment of Combined Sewer Overflows."

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1 Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 EYD (14-12-911)

TITLE OF PROJECT: "Sewer Flow Measurement"

GRANTEE OR CONTRACTOR:
Hydrospace Research Corp.
2150 Fields Road
Rockville, Maryland 20850

EPA PROJECT OFFICER:
Dr. H. R. Thacker
EPA, Office of Research and Monitoring
Washington, D.C. 20460

Project Site: Rockville, Maryland

DESCRIPTION OF PROJECT

Award Date: August 11, 1970 Project Cost: $130,753

Completion Date: December 31, 1972 Federal Cost: $130,753

Summary: This project is to design, fabricate, test, and evaluate a prototype device for measuring wastewater flow in sewers, particularly to meet the very severe requirements for measuring and recording flows in storm sewers and in combined sewers. The objective is to develop a device which will be capable of measuring a full range of open-channel flow in a closed conduit, and flow with the conduit flowing full and under pressure. Its operation is not to be seriously affected by the movement of solids such as sand, gravel, and debris within the fluid flow, and capability for installation in confined and moisture-laden spaces such as sewer manholes is necessary. Ultimate reasonable production cost, and a 5 percent plus or minus accuracy are planned.

The prototype device is to operate on the same principle as hot-wire or hot-film anemometers, which are successfully used for measurement of gas flow and flow of "clean" water under laboratory conditions. One or more insulated electrical resistance elements or probes, will be mounted near the boundary of the sewer channel. Changes in the height and velocity of flow result in variable heat removal from the probe, as provided by conduction and convection currents in the sewage. Therefore, the temperature, or resistance, level in the probe corresponds to the height and velocity of flow in the channel.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 EZW (WPRD 234-01-68)

TITLE OF PROJECT: "A Program for Demonstrating Combined Sewer Overflow Control Techniques for WAter Quality Improvement and Beach Protection"

GRANTEE OR CONTRACTOR:
City of Cleveland
City Hall
Cleveland, Ohio 44114

EPA PROJECT OFFICER:
Mr. George L. Harlow
EPA, Region V
Lake Erie Basin Office
Cleveland, Ohio 44126

Project Site: Cleveland, Ohio

DESCRIPTION OF PROJECT

Award Date: May 3, 1968

Project Cost: $1,030,000

Completion Date: January 1971

Federal Cost: $325,162 $323,562
-54,187 12/69
270,975
+52,587 4/70

Summary:

This project consists of the application of several control and treatment methods designed to abate pollution from combined sewer overflows and control water quality at two bathing beaches on Lake Erie in the City of Cleveland. Control and treatment measures include: (1) hypochlorination of overflows and streams; (2) use of polymers to reduce overflows; (3) sewer flushing to reduce solids in overflows; (4) screening of overflows and streams; (5) protective barriers to enclose beach areas; (6) water quality control within enclosed beach areas; (7) collection of debris and coarse solids; and (8) miscellaneous improvements.

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 FAL (27-Ohio-1)

TITLE OF PROJECT: "Modification of Whittier Street Storm Standby Tanks"

GRANTEE OR CONTRACTOR: City of Columbus Department of Public Services City Hall Columbus, Ohio 43205	EPA PROJECT OFFICER: Mr. Robert L. Feder EPA, Region V 4676 Columbia Parkway Cincinnati, Ohio 45226

Project Site: Columbus, Ohio

DESCRIPTION OF PROJECT

Award Date: March 30, 1967	Project Cost: $1,231,519
Completion Date: March 1971	Federal Cost: $ 300,000

Summary: This project consisted of an evaluation of the pollution reduction effectiveness of storm overflow tanks modernized by installation of automated sluice gates and other equipment. Physical features of the project consist of the renovation of three existing combined sewer overflow tanks. The renovation included automatic controls for the tank influent sluice gates, new travelling bridge type sludge collectors and new pumps. One objective of the automation is to keep sludge levels low by continuously removing it from the tanks and thereby preventing anerobic decomposition and its resultant odors. Another objective is to control flows at the treatment plant by proper use of the automatically operated sluice gates. Evaluation included studies of the efficiency of the tanks as treatment units as well as studies of the effect of the system on the Scioto River. A Final Report on this project has been published entitled "Evaluation of Storm Standby Tanks, Columbus, Ohio.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11020 FAM (24-I11-4)

TITLE OF PROJECT: "Systems Approach to Combined Sewer Stormwater Overflow Pollution Abatement"

GRANTEE OR CONTRACTOR: City of Shelbyville Shelbyville, Illinois 62565	EPA PROJECT OFFICER: Mr. Ralph Christensen Environmental Protection Agency Region V 1 N. Wacker Drive Chicago, Illinois 60606

Project Site: Shelbyville, Illinois

DESCRIPTION OF PROJECT

Award Date:	February 3, 1969	Project Cost:	$2,295,076
Completion Date:	December 1971	Federal Cost:	$440,000

Summary:

This project will demonstrate a systems approach to combined sewer overflow pollution abatement. Three types of treatment will be evaluated as follows: (1) a storm overflow lagoon, followed by primary and secondary stabilization lagoons, will receive flow from 95% of the drainage area; (2) a storm overflow lagoon designed for 600% of dry weather flow; (3) a primary storm holding tank for 600% of dry weather flow with chlorination, comminutor solids collecting facility and a sludge pump for return to treatment plant. These units will be coordinated into a total control system for the community.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 FAN (34-NJ-1)

TITLE OF PROJECT: "Utilization of High Rate Trickling Filters for Treatment of Combined Sewer Overflows"

GRANTEE OR CONTRACTOR:
Borough of New Providence
Park Place
New Providence, New Jersey 07924

EPA PROJECT OFFICER:
Mr. Albert Bromberg
Environmental Protection Agency
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: New Providence, New Jersey

DESCRIPTION OF PROJECT

Award Date: June 16, 1967

Project Cost: $1,192,680

Completion Date: October 1971

Federal Cost: $ 479,000

Summary:

This project consists of the installation of high-rate trickling filters to treat a wide range of overflow volumes. This conventional treatment will be demonstrated on the adverse operating conditions caused by combined sewage. The project will include: surge tank; plastic and a stone filter medium; polyelectrolytes and other chemicals to improve sedimentation; and chlorination facilities. Evaluation will be on operation and effectiveness.

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ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 FAQ (1-Minn-1)

TITLE OF PROJECT: "Dispatching System for Control of Combined Sewer Losses"

GRANTEE OR CONTRACTOR:
Minneapolis-St. Paul Sanitary Dist.
2400 Childs Road
St. Paul, Minnesota 55106

EPA PROJECT OFFICER:
Mr. Darwin R. Wright
Environmental Protection Agency
Office of Research and Monitoring
Washington, D.C. 20460

Project Site: Minneapolis - St. Paul, Minnesota

DESCRIPTION OF PROJECT

Award Date: May 25, 1966

Project Cost: $1,741,500

Completion Date: March 1971

Federal Cost: $ 870,750

Summary: A mathematical model has been prepared that will, with rain gage data as input, perform rainfall runoff analysis, diversion of combined sewer runoff hydrographs at regulators, and routing of diverted hydrographs through the interceptor system. This model will assist in operation of the system to retain combined sewer flows and utilize the maximum flow capacity of the existing interceptor sewer system.

The 1.75 million dollar project includes a computer-based data acquisition and control system that permits remote control of modified combined sewage regulators. Data from rain gages, regulator control devices, trunk sewers and interceptors, and river quality monitors provide real-time operating information. Time varient quality data from key locations in the sewer system were obtained by atuomated analysis of numerous hourly samples.

The reduction in folume of combined overflow to the river is estimated to be between 35% and 70% during the runoff season. The unmodified combined sewer system captured about 65% of the urban runoff. Where modified, the system captured about 77% of the urban runoff. A Final Report has been published on this project entitled "Dispatching System for Control of Combined Sewer Losses."

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 a (1) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 1102 0 FAU (10-Wisc-1)

TITLE OF PROJECT: "Humboldt Avenue Overflow Detention and Chlorination Facility"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Milwaukee 841 North Broadway Milwaukee, Wisconsin 53202	Clifford Risley, Jr. EPA, Region V One North Wacker Drive Chicago, Illinois 60606

Project Site: Milwaukee, Wisconsin

DESCRIPTION OF PROJECT

Award Date: October 15, 1966 Project Cost: $2,208,118

Completion Date: December 31, 1972 Federal Cost: $ 1,468,589

Summary: The project will demonstrate the effectiveness of a detention tank including chlorination facilities for the treatment of combined sewer overflows from a 570 acre urban area. The tank influent will be screened. The tank will be designed to provide a minimum of 15 minutes detention time for sedimentation and chlorination. After an overflow the sludge deposits and remaining wastewater will be pumped to a nearby interceptor sewer for treatment at an existing treatment plant.

Because of the complex nature of the combined sewer system, eight in-system monitoring stations will record flows and sample the overflows.

The overflows presently discharge to the Milwaukee River, seriously impairing most beneficial water uses. Three river monitoring stations will record the dissolved oxygen and temperature, and provide for the collection of river samples to determine the effects of the proposed project on the river water quality.

All data will be analyzed to relate the effectiveness with operation and costs, inclusive of benefits received. Results will be utilized to develop a method for optimizing the design of such facilities and establish relationships to other approaches for achieving comparable results.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 FAV (11-Ind-1)

TITLE OF PROJECT: "East Chicago Treatment Lagoon"

GRANTEE OR CONTRACTOR:
East Chicago Sanitary District
5200 Indianapolis Blvd.
East Chicago, Indiana 46312

EPA PROJECT OFFICER:
Mr. Clifford Risley
EPA, Region V
One North Wacker Drive
Chicago, Illinois 60606

Project Site: East Chicago, Indiana

DESCRIPTION OF PROJECT

Award Date: December 22, 1966

Project Cost: $3,116,533

Completion Date: March 1972

Federal Cost: $1,044,120

Summary: This project will evaluate the effectiveness of treating combined sewer overflows in a very deep detention basin having aerobic and anaerobic treatment. The aerobic conditions are accomplished by surface aerators. The prime objective is to demonstrate a control method to optimize treatment of combined sewer overflows mixed with industrial wastewater.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 FAX (4-Mich-1)

TITLE OF PROJECT: "System Monitoring and Remote Control"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Detroit Board of Water Commissioners Detroit, Michigan 48226	Mr. Lawrence O'Leary EPA, Region V Lake Huron Basin Office Grosse Ile, Michigan 48133

Project Site: Detroit, Michigan

DESCRIPTION OF PROJECT

Award Date: October 12, 1966

Project Cost: $2,113,000

Completion Date: June 1971

Federal Cost: $1,000,000

Summary:

This project consists of installation of power operated diversion structures and automatic control instrumentation. Telemetering will transmit data collected by flow and rainfall measuring instruments to relate status of drainage area and sewerage system for automatic control. This system will maximize the use of storage within the existing sewer system and thereby reduce pollution from combined sewer overflows. An evaluation of the system's effectiveness will be made.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 FDC (14-12-40)

TITLE OF PROJECT: "Development and Demonstration of a Combined Sewer Overflow Treatment System Utilizing New Concepts of Screening and Chemical Oxidation"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Rex Chainbelt, Inc. Milwaukee, Wisconsin 53201	Mr. Clifford Risley, Jr. EPA, Region V 1 North Wacker Drive Chicago, Illinois 60606

Project Site: Milwaukee, Wisconsin

DESCRIPTION OF PROJECT

Award Date:	October 6, 1967	Project Cost:	$377,817
Completion Date:	July 1971	Federal Cost:	$197,989
			157,333 (12/69)
Summary:			22,495 (4/71)
			$377,817

This project will fabricate and demonstrate a 5 MGD system for the treatment of combined sewer overflow using new techniques in chemical oxidation and high rate dissolved air flotation. The flotation unit will operate at 5 to 30% recycle rates of the total flow with 40 to 80 psig. An investigation and demonstration on utilization of sequential screening in conjunction with air flotation will be conducted. Screen sizes will progress from 1,840 to 60 microns.

A Final Report on this project has been published entitled "Screening/Flotation Treatment of Combined Sewer Overflows".

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 FKI (14-12-11)

TITLE OF PROJECT: "Demonstration Project of a Prototype Treatment Plant Designed to Treat Wastes Found at a Combined Sewer Overflow"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Rhodes Corporation United Founder Tower Oklahoma City, Oklahoma 73112	Mr. George Putnicki EPA, Region VI 1600 Patterson Street Dallas, Texas 75202

Project Site: Fort Smith, Arkansas

DESCRIPTION OF PROJECT

Award Date: December 28, 1966 Project Cost: $317,733

Completion Date: December, 1968 Federal Cost: $256,448
61,285 (6/68)
$317,733

Summary:
This project consisted of the design, construction, operation and evaluation of a prototype high capacity treatment facility designed to handle excessive flows received at a treatment plant during periods of storm runoff. The system investigated consists of cyclones followed by high rate dissolved air flotation. For purposes of the demonstration, both wet and dry weather flow was treated. Discreet data for storm events was obtained. In addition to treatment efficiency of the facility, design criteria, operating and maintenance problems and costs were determined. A Final Report on this project has been published entitled "Dissolved Air Flotation Treatment of Combined Sewer Overflows".

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 GYU

TITLE OF PROJECT: "Large Scale Demonstration of Treatment of Storm-Caused Overflow by the Screening Method"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Fort Wayne Number 1 Main Street Fort Wayne, Indiana 46802	Mr. Clifford Risley EPA, Region V 1 N.W. Wacker Drive Chicago, Illinois 60606

Project Site: Fort Wayne, Indiana

DESCRIPTION OF PROJECT

Award Date: May 31, 1971

Project Cost: $1,995,800

Completion Date: December 30, 1973

Federal Cost: $1,057,772

Summary: The project comprises high-rate screening together with stabilization pond holding and pre and post-chlorination for treatment of up to 75 MGD of combined sewer overflows. This demonstration project is intended for integration into the long-range master plan for abatement of municipal pollution from the City-wide collection system.

The primary objectives of this project are:

(a) Determine the effectiveness and cost of screening which includes a method developed under Contract 11023 FDD (Rotary Fine Screening of Combined Sewer Overflows).

(b) The benefits to the receiving water by screening, chlorination and ponding the previously by-passed combined sewer overflows.

(c) Prepare cost and design criteria for various sized similar treatment units.

(d) Prepare an "Operation and Maintenance Manual"

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11020 HFR

TITLE OF PROJECT: "Disinfection/Treatment of Combined Sewer Overflows"
Syracuse, New York

GRANTEE OR CONTRACTOR:
Onondaga County Department
of Public Works
Syracuse, New York 13202

EPA PROJECT OFFICER:
Mr. Richard Field
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: Syracuse, New York

DESCRIPTION OF PROJECT

Award Date: June 29, 1971

Project Cost: $1,699,923

Completion Date: July 30, 1973

Federal Cost: $1,104,984

Summary: The primary objective of the project proposed is to demonstrate the prevention of pollution of Lake Onondaga caused by enteric organisms in combined sewage discharges. The treatment proposed is fine screening and oxidation/disinfection at selected combined sewer overflow sites. The methods of screening to be evaluated are stationary, sequential, microstrainer and high speed rotary. There will also be solids/liquid separation utilizing the vortex separator. Disinfection will be evaluated utilizing gaseous chlorine and chlorine dioxide generated on site by a new and improved technique. Doseage, points of application, aftergrowth, and other factors in kill efficiency will be carried out. A special virus disinfection study will also be included in the project.

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11020 HMM (68-01-0161)

TITLE OF PROJECT: "Continuous Survey of the Literature Related to Storm and Combined Sewers

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
The Franklin Institute Research Laboratory The Benjamin Franklin Parkway Philadelphia, Pennsylvania 19103	Mr. Darwin Wright Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: September 21, 1971 Project Cost: $10,817

Completion Date: September 1972 Federal Cost: $10,817

Summary:

This project consists of a survey of the literature published from July 1, 1971, to June 30, 1972, such as technical journals, conference and symposia proceedings, patents and technical reports to identify items related to the field of storm and combined sewers. Pertinent literature will be catalogued, abstracted and indexed. A compilation of the abstracts will be published in a Final Report.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11020 (29-IDA-2)**

TITLE OF PROJECT: **"Reduction of Ground Water Infiltration into Sewers by Zone Pumping"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Meridian **738 Meridian Street** **Meridian, Idaho 83642**	**Mr. Richard Latimer** **EPA, Region X** **1200 6th Avenue** **Seattle, Washington 98101**

Project Site: **Meridian, Idaho**

DESCRIPTION OF PROJECT

Award Date: **April 21, 1967**	Project Cost: **$25,000**
Completion Date: **June 1969**	Federal Cost: **$18,375**

Summary: **This project was to field demonstrate the reduction of ground water infiltration into sanitary sewers by pumped draw-down of the water table. The water table was shown to be lowered and the flow to the treatment plant reduced. However, this method is not economical when compared to other alternatives.**

A Final Report on this project has been published entitled "Reduction in Infiltration by Zone Pumping"

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11022 DEI

TITLE OF PROJECT: "Sewer Bedding and Infiltration - Gulf Coast Area"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Dr. Frank W. Macdonald Tulane University New Orleans, Louisiana 70118	Francis J. Condon Municipal Pollution Control Branch Office of Research and Monitoring Environmental Protection Agency Washington, D. C. 20460

Project Site: New Orleans, Louisiana

DESCRIPTION OF PROJECT

Award Date:	Sept. 18, 1969	Project Cost:	$36,688
Completion Date:	August 18, 1972	Federal Cost:	$31,538

Summary: Ground water infiltration studies were performed on several sewer systems in 1962-63 and again in 1970 with the results being compared. Infiltration measurements in the systems ranged from zero to 111,560 gallons per inch of diameter per mile per day. The infiltration was slightly increased in some lines and was greatly decreased in others. The decrease is attributed to soil and grease clogging the breaks, as was observed in subsequent television inspection. Infiltration has been found to vary with time. The high infiltration rates were attributed to poor construction methods used by contractors on the main sewer system and by plumbers on house connections. A survey of 1600 manholes showed 3.5 percent to have infiltration at the time of the inspection and others likely to develop infiltration during periods of heavy rainfalls. Most of these could be easily repaired to prevent infiltration. Poor construction procedures are considered to be the most significant contributor to infiltration and sewer failure. This situation can be remedied by modification and elimination through adequate sewer construction.

A Final Report on this project has been published entitled "Sewer Bedding and Infiltration - Gulf Coast Area".

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11022 DMU (14-12-456)

TITLE OF PROJECT: "Analysis of Regulator Facilities, Their Application and Maintenance Practices"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
American Public Works Association 1313 East 60th Street Chicago, Illinois	Mr. Darwin Wright Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date:	August 30, 1968	Project Cost:	$97,800
Completion Date:	May 1970	Federal Cost:	$97,800

. Summary:

This project analyzed combined sewer regulator facilities to determine needed improvements for reducing pollution. The results contain design criteria and operation and maintenance practices, stressing newly developed or improved materials and technology, and identifying future R&D needs. Two Final Reports on this project have been published entitled "Combined Sewer Regulator Overflow Facilities" and "Combined Sewer Regulation and Management - A Manual of Practice."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11022 DPP (14-12-133)

TITLE OF PROJECT: "Pilot Plant for Underwater Storage of Combined Sewer Overflows"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Mel-Labs, Inc. 6631 Iron Place Springfield, Virginia 22150	Mr. George Kirkpatrick EPA, Office of Research and Monitoring Washington, D. C. 20460

Project Site: Cambridge, Maryland

DESCRIPTION OF PROJECT

Award Date: December 14, 1967 Project Cost: $424,452

Completion Date: August 31, 1971 Federal Cost: $424,452

Summary: The project included construction and evaluation of a pilot plant underwater facility for temporary storage of combined sewer overflows. The facility consists of a single 200,000 gallon container, the bottom of which was of vinyl coated steel placed in an excavated depression in the river bottom. The upper half was of flexible neoprene coated nylon. Following overflows, the stored sewage was pumped back to the sewerage system. A Final Report has been published on this project entitled "Combined Sewer Temporary Underwater Storage Facility"

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11022 DQI

TITLE OF PROJECT: "A Pressure Sewer System Demonstration"

GRANTEE OR CONTRACTOR:
New York State Dept. of Health
84 Holland Avenue
Albany, New York 12208

EPA PROJECT OFFICER:
Mr. Richard Keppler
EPA, Region I
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Project Site: Albany, New York

DESCRIPTION OF PROJECT

Award Date: April 16, 1969	Project Cost: $311,800
Completion Date: July 1972	Federal Cost: $200,800

Summary: The New York State Department of Health has undertaken a 21 month project to install, demonstrate and evaluate a pressure sewer system which could be utilized to separate sanitary sewage from combined sanitary sewage and storm water. A pilot-scale system will be designed to serve 11-12 houses in a redevelopment area in Albany, New York, presently served by combined sewers. Prototype pump-grinder units developed by the General Electric Company as a part of the ASCE Contract (14-12-29) would be utilized to convey sewage from the home to the pressure sewer in the street.

Four principal objectives are incorporated in the project: (1) monitoring, evaluation of the prototype pump-grinder units to determine reliability and need for modification or redesign. (2) test durability of the units operating singly and in concern (manifolded to common pressure sewer). (3) provide proof of the field suitability of the assemblage, which should be considered a module of a larger pressure system. (4) provide new data which would be invaluable in subsequent pressure system applications.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11022 DZU

TITLE OF PROJECT: "Use of Polymers to Reduce or Eliminate Sewer Overflow in the Bachman Creek Sewer"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Dallas 500 South Ervay Street Dallas, Texas 75201	Mr. Robert L. Hiller EPA, Region VI 1402 Elm Street Dallas, Texas 75202

Project Site: Dallas, Texas

DESCRIPTION OF PROJECT

Award Date: May 23, 1969	Project Cost: $441,647
Completion Date: Feb. 1974	Federal Cost: $331,233

Summary: The project consists of the design, construction and evaluation of a permanent polymer injection station on the Bachman Creek Sewer in Dallas, Texas The project will further demonstrate and evaluate a technique developed earlier for FWPCA by contract which utilizes injection of polymers into a sewer for the purpose of increasing the carrying capacity of the pipe.

During periods of wet weather the Bachman Creek sewer receives excess quantities of ground or storm water due to infiltration. The flow then exceeds its carrying capacity and untreated wastes overflow in at least 10 locations, causing pollution of Bachman Creek. The project will seek to eliminate or greatly reduce the number and volume of untreated overflows by increasing the flow capacity of the Bachman Creek Sewer through the addition of polymers. Design criteria, operating techniques, optimum polymer concentration and other pertinent data critical to the intended use will be evaluated.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11022 ECV (14-12-143)

TITLE OF PROJECT: "Construction of a Facility to Demonstrate Offshore Underwater Temporary Storage of Storm Overflow from a Combined Sewer"

GRANTEE OR CONTRACTOR:
Karl R. Rohrer Associates
529 Grant Street
Akron, Ohio 44311

EPA PROJECT OFFICER:
Mr. Harry C. Torno
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Sandusky, Ohio

DESCRIPTION OF PROJECT

Award Date: 12/14/67	Project Cost: $578,575
Completion Date: 2/71	Federal Cost: $578,575

Summary: The purpose of this study was to demonstrate off-shore underwater temporary storage of storm overflow from a combined sewer in flexible tanks. Site selection, model testing, system design, construction, and one year's operation were conducted under the study.

A pilot demonstration facility was constructed in Sandusky, Ohio where combined sewer overflow from a 14.86-acre residential drainage area was directed to two-100,000 gallon collapsible tanks anchored underwater in Lake Erie. The stored overflows were pumped back to the sewer system after a storm event for subsequent treatment. During the year's operation, a total of 988,000 gallons of storm overflow was contained and returned for treatment.

As constructed, the facility cost was about $1.88 per gallon of storage capacity while future projections indicate costs of less than $0.40 per gallon possible.

Evaluation of the underwater storage system in controlling combined sewer pollution, comparison of cost with other storage methods and other combined sewer pollution control methods, operational difficulties and recommendations of an improved system are included in the study report.

A final report has been published on this project, entitled "Underwater Storage of Combined Sewer Overflows."

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11022 EFF (14-12-550)

TITLE OF PROJECT: "Causes and Control of Ground Water Infiltration into Sewers"

GRANTEE OR CONTRACTOR:
American Public Works Association
Research Foundation
1313 E. 60th Street
Chicago, Illinois 60637

EPA PROJECT OFFICER:
Mr. Darwin Wright
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date: May 23, 1969

Completion Date: August 1970

Project Cost: $96,015

Federal Cost: $89,780
6,235 (2/71)
$96,015

Summary:

This project consisted of a study of the causes and control of storm and ground water infiltration into sanitary and combined sewers -- including investigation of sewer design, construction, testing and inspection, and grouting practices. Specific objectives include: (1) catalog the extent and causes, (2) delineate the relative importance of various sources, (3) investigate present design criteria and practices, (4) review present construction, testing and inspection practices and techniques, (5) investigate present infiltration detection, leak location and grouting techniques and practices, (6) identify future research, development and demonstration needs. A Final Report has been published on this project entitled "Control of Infiltration and Inflow Into Sewer Systems." A Manual of Practice entitled "Prevention and Correction of Excessive Infiltration and Inflow into Sewer Systems" is also available.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(1) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11022 ELK (13-WASH-1)

TITLE OF PROJECT: "Duwamish River - Elliott Bay Storm Water Control System"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Municipality of Metropolitan Seattle 400 West Harrison Street Seattle, Washington 98119	Mr. James C. Willmann Environmental Protection Agency Region X 1200 Sixth Avenue Seattle, Washington 98101

Project Site:
Seattle, Washington

DESCRIPTION OF PROJECT

Award Date:	12/29/66	Project Cost:	$3,891,900
Completion Date:	6/73	Federal Cost:	$1,400,000

Summary: Objectives is to demonstrate the use of a computer augmented treatment and disposal (CATAD) system to utilize maximum storage in existing combined sewers to minimize overflows. Flows to the waste treatment facilities will be controlled to improve efficiency of plant operation during rainfall periods and to provide selective controlled discharging of storm-water overflow at differenct points in a manner which will minimize the effect of waste discharges in the receiving waters. Automatic water quality monitors will be utilized as control devices in triggering discharges to surface water from the regulator stations. Functions of the system for controlling pollution caused by storm water overloading of treatment facilities and sewerage system overflows will be evaluated.

An Interim Report on this project has been published entitled "Maximizing Storage in Combined Sewer Systems".

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) *, Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11022 EMD (31-ILL-6)

TITLE OF PROJECT: "Lawrence Avenue Underflow Sewer"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Department of Public Works City of Chicago Chicago, Illinois 60602	Mr. Clifford Risley EPA, Region V 1 N.W. Wacker Drive Chicago, Illinois 60606

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date: June 19, 1967 Project Cost: $20,021,067

Completion Date: June 30, 1973 Federal Cost: $ 1,500,000

Summary: The project is to construct a machine bored tunnel of 16,600 lineal feet of 12-foot tunnel and 9,300 lineal feet of 17-foot tunnel at a depth of 200 - 250 feet in the Niagaran limestone stratum for storage of excess combined sewage from a 3,620 acre urban area. Included are necessary inlet shafts, outlet shafts, vents, pumpage and new conventional trunk sewers.

There are allied research projects associated with this work. Examples are "Hydraulics of Long Vertical Conduits and Associated Cavitation" and the Engineering Institute "Deep Tunnels in Hard Rock." Various methods of high rate treatment developed by the Storm and Combined Sewer Pollution Control Program are being evaluated for incorporation into the storage concept.

This facility will eliminate approximately 48 of 52 yearly overflow events.

Detailed cost data are being developed for the various and improved mining techniques for utilization in future planning.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11022 FLV

TITLE OF PROJECT: "Stream Pollution Abatement by Supplemental Pumping"

GRANTEE OR CONTRACTOR:

City of Richmond
City Hall
Richmond, Virginia 23219

Project Site: Richmond, Virginia

EPA PROJECT OFFICER:

Mr. Fenton Roudabush
Region III, Environmental Protection Agency
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

DESCRIPTION OF PROJECT

Award Date: January 26, 1970

Completion Date: November 1972

Project Cost: $376,030

Federal Cost: $282,022

Summary:

The City of Richmond will demonstrate that by-passing of sewage during construction of sewage treatment works can be avoided by applying ingenuity in the areas of engineering design and construction. The project will demonstrate the application of a flexible alternative to the common practice of by-passing raw sewage during construction. The demonstration project includes the construction of a supplemental pumping system incorporating a special diversion device which will permit the wastewater treatment plant to remain on-stream during the tie-in of critical elements of the treatment works. The system will be designed so that it will not only achieve by-pass prevention, but will also demonstrate the use of expeditious, low-cost techniques that may include removable dredge or other pumps which can be utilized in other portions of the sewerage system or loaned to other communities with by-pass problems.

The City will maintain detailed records, including pictorial information, relating to the design, construction, operation and maintenance during the entire project period and will evaluate the data to assess the value of the techniques employed for potential nationwide application.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11022 FWR

TITLE OF PROJECT: "Combined Sewer Fluidic Regulator Demonstration"

GRANTEE OR CONTRACTOR:
Philadelphia Water Department
1160 Municipal Services Bldg.
Philadelphia, PA 19107

EPA PROJECT OFFICER:
Mr. Richard Field
Environmental Protection Agency
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: September 18, 1970
Project Cost: $111,445

Completion Date: April 1973
Federal Cost: $ 77,410

Summary:

This project will demonstrate the design concept developed under Project No. 11020 DGZ "Fluidic Interceptor Study." The design rationale will be used in the design, construction and operation of a full-size combined sewer fluidic regulator installed in two typical locations in the Philadelphia sewer system.

Specific objectives of the project are: (1) Design, construct and operation of a fluidic regulator for a flow range below 2 CFS with a minimum of reconstruction, and one for a 4 CFS peak dry weather flow. The automatic control of overflows will be done by sensing the interceptor level. No overflows will occur until the interceptor reaches a predetermined limit; (2) assembly of data from a one year evaluation and testing program, so that the application of fluidics to sewer regulator design can be demonstrated on a full-scale basis.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11023 DAA (14-12-490)

TITLE OF PROJECT: Hypochlorination to Sterilize Storm Sewer Outfalls"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Ionics, Incorporated 65 Grove Street Watertown, Mass. 02172	Mr. Allyn Richardson EPA, Region I John F. Kennedy Federal Building Boston, Massachusetts

Project Site: Boston, Massachusetts

DESCRIPTION OF PROJECT

Award Date: February 19, 1969   Project Cost: $74,496

Completion Date: April 1970   Federal Cost: 74,496

Summary:

This project consists of a study to determine the feasibility and economics of operation of a high current density hypochlorite generator for utilization in the treatment of combined sewer overflows and/or storm sewer discharges. If technical and economical feasibility is determined, the contractor will prepare a prototype design in sufficient detail to permit fabrication and field testing of a full-scale device. The prototype design shall be modular in nature and compatible with current hypochlorite feeding devices. Over-all operation and maintenance costs shall be developed. An operation and maintenance manual will be provided. A Final Report on this project has been published entitled "Hypochlorite Generator for Treatment of Combined Sewer Overflows."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 DME

TITLE OF PROJECT: "Somerville Marginal Conduit Including Pretreatment Facilities"

GRANTEE OR CONTRACTOR:
Metropolitan District Commission
Boston, Massachusetts 02108

EPA PROJECT OFFICER:
Mr. William Butler
Construction Grants Program
Region I
John F. Kennedy Bldg.
Boston, Massachusetts 02203

Project Site: Somerville, Massachusetts

DESCRIPTION OF PROJECT

Award Date: March 31, 1970

Project Cost: $1,485,000

Completion Date: May 31, 1973

Federal Cost: $ 452,000

Summary: A conduit, diameter 7 ft., is being constructed to drain new highway construction and relieve a combined sewer outfall which now discharges above the Amelia Earhart dam on the Mystic river. The goal is to improve water quality above the dam for recreational purposes by removing a point source of pollution while providing treatment to the excess flow during transport to the new outfall site. The objectives are to develop, demonstrate and evaluate the effectiveness and cost of utilizing screening and a high density electrolytic cell technique for the generation of sodium hypochlorite to treat excess combined sewage.

Project implementation will include construction of screening facilities, a compact chlorine generation plant and a seven foot diameter, 2,700 ft. long discharge conduit (Somerville Marginal Conduit). The conduit will serve as the chlorine contact portion of the treatment facility, with the capability to regulate flow in a manner which will permit variation of chlorine contact time. Optimum land use will be obtained by utilizing space under a highway access ramp as a facility site. Effectiveness of chlorine (hypochlorite) generation and all other pertinent aspects of the treatment method will be fully evaluated in terms of cost and efficiency of treatment. Disinfection of the electrolytic cells will be subject to detailed evaluation including optimization of cell geometry, electric current consumption, cell efficiencies and other pertinent factors relating to field application of this and similar units at other locations.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 DPI (WA 67-2)

TITLE OF PROJECT: "Rapid Flow Combustible Filter"

GRANTEE OR CONTRACTOR:
Rand Development Corporation
13600 Deise Avenue
Cleveland, Ohio 44110

EPA PROJECT OFFICER:
Mr. Robert L. Feder
EPA, Region V
4676 Columbia Parkway
Cincinnati, Ohio 45226

Project Site: Cleveland, Ohio

DESCRIPTION OF PROJECT

Award Date:	August 8, 1966	Project Cost:	$404,850
Completion Date:	December 1969	Federal Cost:	$300,000
			105,000 (11/68)
Summary:			150 (8/69)
			$404,850

This project included construction and evaluation of rapid flow combustible filter for treating combined sewer overflows. The filter media used for mechanical filtration of coarse solids was primarily coal. The process incinerates the filter media upon exhaustion. The project evaluation rendered this method unfeasible. A Final Report on this project has been published entitled "Rapid-Flow Filter for Sewer Overflows."

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11023 DSX

TITLE OF PROJECT: "Treatment of Peak Wet Weather Wastewater Flows, and Rate Cortrol of All Wastewater Discharges to Interceptor Sewers"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Rohnert Park 435 Southwest Boulevard Rohnert Park, California 94928	Dr. William D. Bishop EPA, Region IX 760 Market Street San Francisco, California 94102

Project Site: Rohnert Park, California

DESCRIPTION OF PROJECT

Award Date: October 10, 1969 Project Cost: $488,538

Completion Date: February 1, 1973 Federal Cost: $359,568

Summary: Inflow of storm water to the City of Rohnert Park sanitary sewer system causes peak wet weather flow of up to 10 times the average dry weather flow. As a result, the treatment plant becomes ineffective for period of several weeks.

A new combined sedimentation and flow equalization pond will be constructed to include an unique sludge collection system for use during wet weather and an aerator for dry weather use only. All excess wet weather overflow from this pond would be delivered to a storage and chlorination pond (the existing oxidation pond), and would be released to the receiving stream after about two days detention and chlorine contact. Dry weather flow and solids collected in the equalization pond would underflow to the existing primary sedimentation basin and sludge digester. Achievement of a nearly constant underflow would serve to demonstrate its effect on operation of the existing facility, and to demonstrate the feasibility of designing a less costly interceptor sewer for later transport of the underflow to a Regional treatment plant. Extension of this system to other plants in the area could serve to reduce the cost of a Regional plant.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 DXC (WPRD 258-01)

TITLE OF PROJECT: **"Treatment of Combined Sewer Overflows by the Dissolved Air Flotation Process:**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City and County of San Francisco **Public Works Department** **San Francisco, California 94102**	**Mr. Robert Rock** **EPA, Region IX** **California-Nevada Basins Office** 100 California Street San Francisco, California 94111

Project Site: **San Francisco, California**

DESCRIPTION OF PROJECT

Award Date: **July 24, 1969**	Project Cost: **$2,937,761**
Completion Date: **October 1971**	Federal Cost: **$ 921,000**

Summary: The project consists of the design, construction and evaluation of a combined sewer overflow treatment facility at the Baker Street Outfall consisting of trash racks, short-term sedimentation for removal of settleable solids, dissolved air flotation for removal of particulate and liquid floatables and disinfection utilizing chlorine.

Conditions of the receiving waters will be thoroughly investigated prior to placing the facility in operation and the cost/effectiveness of the treatment facility evaluated following construction.

The character of combined sewage in the drainage area tributary to the Baker Street Outfall will be defined and the applicability of the treatment process to other outfalls in the San Francisco sewerage system assessed.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11023 DZF (14-12-195)

TITLE OF PROJECT: "Fabrication and Evaluation of an Ultrasonic Filtration System for Treating Combined Sewer Overflows"

GRANTEE OR CONTRACTOR:
American Process Equipment Corp.
3309 W. ElSegundo Boulevard
Hawthorne, California 90250

EPA PROJECT OFFICER:
Mr. Darwin Wright
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Panama City, Florida

DESCRIPTION OF PROJECT

Award Date:	June 25, 1968	Project Cost:	$258,509
Completion Date:	June 1970	Federal Cost:	$248,500
			10,009 (10/70)
			$258,509

Summary:

The project fabricated and demonstrated a prototype ultrasonic filtration system (maximum capacity 160 gpm). 65% BOD and SS removals for a 50 micron element treating raw sewage (degrited) has been previously demonstrated in the laboratory. Ultrasonic energy can restore filter elements to "like new" condition without frequent element replacements. Pretreatment requirements were determined and automatic operating procedures established. A Final Report has been published on this project entitled "Ultrasonic Filtration of Combined Sewer Overflows."

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 EKC

TITLE OF PROJECT: "Biological Adsorption of Pollutants from Combined Storm Water Runoff and Sanitary Sewage"

GRANTEE OR CONTRACTOR:
Kenosha Water Utility
Kenosha, Wisconsin 53140

EPA PROJECT OFFICER:
Mr. Clifford Risley, Director
R&D Programs
Region V
1 N. Wacker Drive
Chicago, Illinois 60606

Project Site: Kenosha, Wisconsin

DESCRIPTION OF PROJECT

Award Date: September 15, 1970 Project Cost: $1,380,800

Completion Date: December 31, 1972 Federal Cost: $ 868,700

Summary: The project objective is to provide a means for high rate biological adsorptive treatment of combined sewage by the utilization of viable activated sludge, clarification, and disinfection. The method will be to store activated sludge in a biosolids reservoir and maintain a contact tank and a solids stabilization tank in an empty and ready condition at a location adjacent to the sewage treatment plant. When a rain event occurs, the excess combined sewage is directed to the contact tank and the activated sludge solids proportioned in. After a contact period (15 - 30 minutes) during which pollutants are adsorbed by the biosolids, the mixed liquor is discharged to a clarifier for solids/liquid separation. The effluent is disinfected and discharged to receiving waters. The sludge solids are discharged to the stabilization tank and reused or sent to digestion facilities as required.

The State of Wisconsin appreciates the City's problem and needs. The State also recognizes the real and potential benefits this demonstration will provide. Consequently, the Wisconsin Department of Natural Resources will contribute $299,600 in support of the construction costs and to ensure continuation of the project. The willingness of the State to participate at this high level on a demonstration project indicates the high priority they place on evaluating and utilizing this concept for treatment of combined sewer overflows. In addition, this partnership of City, State and Federal agencies in demonstrating and evaluating new approaches to solution of water pollution problems is the type of operation we wish to encourage.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 EVO (14-12-136)

TITLE OF PROJECT: "Microstraining Pilot Tests"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Crane Company	Mr. Allyn Richardson
Cochrane Division	EPA, Region I
Crane Circle	John F. Kennedy Federal Building
King of Prussia, PA	Boston, Massachusetts 02203

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: December 27, 1967	Project Cost: $180,086
Completion Date: December 1969	Federal Cost: $180,086

Summary:

This project involved the construction, operation, and evaluation of the use of microstrainers for treating combined sewer overflows. Microstrainers are currently used in raw water supply treatment and for polishing sewage treatment plant effluent. The demonstration site will be on park property in the City of Philadelphia, Pa. The applicability of ozone to disinfect flows will also be evaluated. Ozone is used fairly extensively in Europe for water supply disinfection, but has had only limited use in this country. A Final Report on this project has been published entitled "Microstraining and Disinfection of Combined Sewer Overflows"

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 EYC (14-12-855)

TITLE OF PROJECT: "Development of a Flocculation-Flotation Module"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hercules, Inc. 910 Market Street Wilmington, Deleware 19899	Mr. Clifford Risley EPA, Region V 1 North Wacker Drive Chicago, Illinois 60606

Project Site: Wilmington, Delaware

DESCRIPTION OF PROJECT

Award Date: April 22, 1970 Project Cost: $110,291

Completion Date: November 1971 Federal Cost: $110,291

Summary:

This project will develop and assess variables associated with flocculation as an aide to flotation, i.e., flocculant concentration vs. bouyant effect, sewage solids shock load effect, optimum scheme and permissible flow for treatment.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 EYI (14-12-858)

TITLE OF PROJECT: "Study of High Rate Filtration for Treating Combined Sewage Storm Overflows"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hydrotechnic Corporation 641 Lexington Avenue New York, New York 10022	Mr. Richard Field EPA, Edison Water Quality Laboratory Edison, New Jersey 08817

Project Site: Cleveland, Ohio

DESCRIPTION OF PROJECT

Award Date: May 4, 1970	Project Cost: $393,574
Completion Date: February 1972	Federal Cost: $393,574

Summary:

This project investigated the feasibility of using screening and tri-media filtration in treatment of combined sewer overflows at the Cleveland Southerly Sewage Treatment Plant. The major objective is effective removal of suspended and settleable solids at filter rates of 20 gpm/sf or greater. Treatment of secondary effluents has also been studied.

A Final Report on this project has been published entitled "High Rate Filtration of Combined Sewer Overflows."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11023 FAO** (36-NY-2)

TITLE OF PROJECT: "Evaluation of Spring Creek Auxiliary Pollution Control Project"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of New York	**Mr. Anthony N. Tafuri**
Dept. of Water Resources	**Staff Engineer**
New York, New York 10007	**Edison Water Quality Laboratory**
	Edison, New Jersey 08817

Project Site: **New York, New York**

DESCRIPTION OF PROJECT

Award Date: **January 16, 1968** Project Cost: **$1,126,000**

Completion Date: **October 31, 1972** Federal Cost: **$844,500**

Summary: **The Demonstration Project is designated as a three-phase project. Phase I titled, "Characterization of those Parameters that Measure the Effects of Combined Overflows" will develop and evaluate data from existing combined sewers prior to discharging into Jamaica Bay during periods of dry weather and periods of rainfall. Quality data pertaining to rainfall-runoff relationships, sewage flow and quality for the combined sewers discharging in the Jamaica Bay area will be related to water quality obtained through intensive investigation of Jamaica Bay and Spring Creek during both wet and dry periods. This phase will characterize discharges from combined sewers in the area of investigation and determine their relationships to water quality in Jamaica Bay and Spring Creek.**

Phase II relating to "A Study of the Pre-Conditions in the Area of Concern", for the Spring Creek Project will be carried out following successful completion of Phase I. Phase III, "A Post Construction Survey to Determine the Effectiveness of the Treatment Process Related to an Evaluation of the Value Received in Upgrading the Waters Based on the Cost of the Project", will follow Phase II.

The phased work will be reported by task as each task is completed:

a. Water Quality Prediction and Evaluation.
b. Evaluation of Spring Creek Auxiliary Facility.
c. Water Pollution Control Alternatives.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11023 FAR (37-MICH-2)

TITLE OF PROJECT: "A Combined Sewage Collection are Treatment Facility"

GRANTEE OR CONTRACTOR:
City of Mount Clemens
One Crocker Boulevard
Mount Clemens, Michigan 48043

EPA PROJECT OFFICER:
Mr. Lawrence O'Leary
EPA, Region V
Lake Huron Basin Office
Grosse Ile, Michigan 48133

Project Site: Mt. Clemens, Michigan

DESCRIPTION OF PROJECT

Award Date: March 26, 1968

Project Cost: $915,153

Completion Date: December 1971

Federal Cost: $631,989

Summary: The project will demonstrate the feasibility of controlling combined sewer overflows by constructing three aerated "lakelets" which will be equipped with surface aeration and operated in series. "Lakelet" effluents will be subjected to chemical treatment, microstraining and chlorination prior to discharge to the Clinton River. The project will also explore these "lakelets" for use as recreation facilities.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1)*,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11023 FAS (14-LA-1)

TITLE OF PROJECT: "Hypochlorination of Polluted Storm Water Pumpage"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Sewerage and Water Board of New Orleans New Orleans, Louisiana 70112	Mr. Robert Hiller EPA, Region VI 1600 Patterson St. Dallas, Texas 75202

Project Site: New Orleans, La.

DESCRIPTION OF PROJECT

Award Date: December 15, 1966 Project Cost: $1,429,000

Completion Date: Sept. 1, 1972 Federal Cost: $1,034,250

Summary: The primary objective is to disinfect urban runoff which has caused closing of bathing beaches in Lake Pontchartrain. To control bacteriological pollution in Lake Pontchartrain the project will demonstrate the effectiveness, efficiency, and economics of using open drainage canals as treatment facilities; the effectiveness of hypochlorite disinfection on intermittent high flow discharges; and the optimization of various feeding rates, multiple points of application, and contact time. Facilities for disinfection will be placed and operated in the St. Charles Canal, the London Avenue Canal, and the Orleans Avenue Canal. A sodium hypochlorite blending plant has been constructed and a chlorine alarm system installed. The project will include the provision of appropriate instrumentation for the generation of quantitation and qualitative data necessary for a comprehensive evaluation.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 FAT (7-Mass-1)

TITLE OF PROJECT: "Boston University Bridge Storm Water Detention and Chlorination Station"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Metropolitan District Commission 20 Somerset Street Boston, Massachusetts 02108	Mr. Allyn Richardson Region I, Environmental Protection Agency John F. Kennedy Federal Building Boston, Massachusetts 02203

Project Site: Cambridge, Massachusetts

DESCRIPTION OF PROJECT

Award Date: September 2, 1966	Project Cost: $4,345,650
Completion Date: October 1972	Federal Cost: $1,000,000

Summary:

A detention basin will be constructed to intercept peak flows and to chlorinate waste water, as a means of reducing combined sewage overflows into the Charles River.

The project includes the construction and evaluation of a combined sewer overflow facility, designed to provide a 10-minute minimum sedimentation-detention time with an influent of 233 MGD. An electrochemical hypochlorite generator will be used for on-site production of sodium hypochlorite. The chlorinated effluent will flow by gravity from the detention tanks through a 96-inch outfall pipe into the Charles River. Sludge deposits in the detention tanks will be returned to the sewer system to be treated at the sewage treatment plant. All settled materials will be flushed out of the tanks and into the sewer system after the storm subsides.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6(a)1 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11023 FAW (35-Tx-1)

TITLE OF PROJECT: "Stormwater Treatment Facilities"

GRANTEE OR CONTRACTOR:

City of Dallas
210 City Hall, Main & Harwood
Dallas, Texas 75201

EPA PROJECT OFFICER:

Mr. Robert L. Hiller
Region VI, Environmental Protection Agency
1402 Elm Street
Dallas, Texas 75202

Project Site: Dallas, Texas

DESCRIPTION OF PROJECT

Award Date: May 21, 1968

Completion Date: August 1972

Project Cost: $1,488,732

Federal Cost: $1,093,360

Summary:

The project consists of the design, construction and evaluation of a facility to treat overflows from sewers carrying a mixture of domestic wastewater infiltration and stormwater. Physical features include a diversion structure, pumping station, flocculation and sedimentation basins, chemical feed facilities, and a pipeline for conveyance of waste lime sludge from the municipal water treatment plant to the overflow treatment facility.

Treatment Unit #1 will include flocculation, sedimentation and polishing treatment with tube-type clarifiers; Unit #2 will include flocculation and sedimentation; Unit #3 will include high-rate sedimentation. Effluent from the facility will be chlorinated. Design flow rate will be 28 million gallons per day.

The facility will be operated and evaluated as a demonstration project for a period of one year following completion of construction.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a 1 Contract *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11023 FDB (14-12-9)

TITLE OF PROJECT: "Demonstration and Evaluation of Polymeric Additives in "Treatment of Stormwater Overflow"

GRANTEE OR CONTRACTOR:
Dow Chemical Company
Midland, Michigan 48640

EPA PROJECT OFFICER:
Mr. R. G. Christensen
Environmental Protection Agency
Region V
1 North Wacker Drive
Chicago, Illinois 60606

Project Site: Detroit, Michigan

DESCRIPTION OF PROJECT

Award Date: June 15, 1967

Project Cost: $700,000

Completion Date: December 1969

Federal Cost: $700,000

Summary: This project consisted of flocculant studies on both laboratory and full-scale to demonstrate the effect of polymeric flocculants including the effectiveness of disinfectants with and without polymer addition. The installation studied was a 3.5 MG detention basin serving an area of about 3,700 acres. A part of this project was the fabrication of the existing basin model. This model was concurrently tested with the full-scale basin to validate and optimize its use for model extrapolation.

A Final Report of this project has been published entitled "Chemical Treatment of Combined Sewer Overflows."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11023 FDD (14-12-128)

TITLE OF PROJECT: "High Rate, Fine Mesh Vibrating Screen Demonstration"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Cornell, Howland, Hayes & Merryfield 1600 Western Avenue Corvallis, Oregon 97330	Mr. Frank Condon Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Corvallis, Oregon

DESCRIPTION OF PROJECT

Award Date: August 17, 1967	Project Cost: $139,331
Completion Date: January 1971	Federal Cost: $139,331

Summary:

This project included the design, construction, demonstration, and evaluation of the performance of high rate, fine mesh vibrating screens for removal of solids from combined sewage.

Various attempts have been made to use vibratory screens in sewage treatment in the past. Grease formation and varying rates of flow were persistent problems. The contractor has several innovations in screen configuration and combinations to be constructed and demonstrated which may reduce these operating difficulties.

Development of such devices, which are compact and adaptable, are needed for primary treatment of excess combined sewage at low initial cost. The Final Reports on this project have been published entitled "Rotary Vibratory Fine Screening of Combined Sewer Overflows" and "Demonstration of Rotary Screening for Combined Sewer Overflows"

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 FIX (14-12-829)

TITLE OF PROJECT: "Preliminary Engineering Investigation, Kingman Lake Recreation Area"

GRANTEE OR CONTRACTOR:
Roy F. Weston, Incorporated
1426 Lewis Lane
West Chester, Pennsylvania 19380

EPA PROJECT OFFICER:
Mr. Darwin Wright
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date: December 30, 1969

Project Cost: $137,750

Completion Date: May 1970

Federal Cost: $137,500

Summary:

This project consisted of an engineering investigation to develop design parameters, soils information and cost estimates necessary for the construction of a combined sewer overflow treatment facility for the Northeast Boundary Trunk Sewer drainage area, Washington, D. C. The overflows are intended for reuse in the Kingman Lake recreational area for boating, fishing and swimming. A Final Report on this project has been published entitled "Conceptual Engineering Report - Kingman Lake Project."

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11023 FIY (22-WISC-2)**

TITLE OF PROJECT: **"Surface Storage and Treatment of Combined Sewer Overflows"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Chippawa Falls **City Hall** **Chippawa Falls, Wisconsin**	**Mr. Louis Breimhurst** **EPA, Region V** **Lake Superior Basin Office** **58th Street & 40th Avenue South** **Minneapolis, Minnesota 55450**

Project Site: **Chippawa Falls, Wisconsin**

DESCRIPTION OF PROJECT

Award Date:	**December 29, 1966**	Project Cost:	**$648,665**
Completion Date:	**January 1971**	Federal Cost:	**$304,685**

Summary: **This project will demonstrate the control and elimination of combined sewer overflows by diverting to a storage pond for sedimentation with subsequent discharge to the wastewater treatment plant. Project also includes construction for increased interceptor pumping capacity, final settling tank capacity, combined relief sewer and some separation. Evaluation will include: design, operation, efficiency, and comparison with separation.**

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11023 FWS

TITLE OF PROJECT: "Screening/Dissolved Air Flotation Treatment of Combined Sewer Overflows

GRANTEE OR CONTRACTOR:
City of Racine
Racine, Wisconsin 53403

EPA PROJECT OFFICER:
Mr. Clifford Risley, Director
R&D Programs
Region V
1 North Wacker Drive
Chicago, Illinois 60606

Project Site: Racine, Wisconsin

DESCRIPTION OF PROJECT

Award Date: October 1, 1970 Project Cost: $2,076,564

Completion Date: December 1, 1974 Federal Cost: $1,359,522

Summary: The primary objectives are: to evaluate the screening/dissolved-air flotation process developed under EPA project 11023 FDC as an alternate to the physical separation of those combined storm and sanitary sewers that overflow into the last four miles of the Root River in Racine, Wisconsin; and to evaluate and modify (if required) the combined sewer mathematical model developed under EPA Project 11024 EBI "Stormwater Pollution Control Management."

Project implementation will include: the selection of an optimum reach of the Root River for investigation, preparation and installation of sampling/gaging stations in the river and at the selected combined sewer overflow and stormwater discharge points, design fabrication and installation of the newly developed screening/dissolved air treatment system, operation and evaluation of the treatment system. Included in the above grouping of overall tasks are: survey of discharges and drainage areas, establishing base line data on river quality, combined sewage and urban surface runoff characteristics and volume and other tasks as required. The objective to evaluate and modify the mathematical model will progress throughout the life of the project.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11023 FWT

TITLE OF PROJECT: "Combined Sewers-Microstraining Pilot Tests"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Philadelphia Water Department 1160 Municipal Services Bldg. Philadelphia, PA 19107	Mr. Richard Field Environmental Protection Agency Edison Water Quality Laboratory Edison, New Jersey 08817

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: September 18, 1970	Project Cost: $109,400
Completion Date: May 1972	Federal Cost: $ 82,000

Summary:

This project consists of improvements and/or modifications of the various operational functions of the microstraining process developed under Project No. 11023 EVO "Microstraining and Disinfection of Combined Sewer Overflows" and applied to overflows in the City of Philadelphia. The project will provide optimization of each step of the process system defining best design and definition of operation and maintenance factors.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11023 GSC

TITLE OF PROJECT: "Demonstration of an Underground Storage Silo-Vortex Regulator/Solid Separator System for Control of Combined Sewer Overflows"

GRANTEE OR CONTRACTOR:
City of Lancaster
Lancaster, Pennsylvania 17604

EPA PROJECT OFFICER:
Mr. Richard Field
Environmental Protection Agency
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: Lancaster, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: May 13, 1971

Project Cost: $1,718,000

Completion Date: March 1974

Federal Cost: $1,289,250

Summary:

This project will demonstrate an underground storage "silo" proceded by a vortex regulator/solids separator. Excessive flows bypassing the "silo" will be treated by fine-mesh screening and disinfection. Design criteria will be developed by computer simulation in conjunction with laboratory models. A full-scale prototype will be designed and installed.

The project also includes application and further refinement of the EPA Storm Water Management Model. The model will be used to evaluate and assist in the design of the demonstration project. By further developmental work to include a decision-making capability, it will be used to prepare a master plan for the City of Lancaster.

A submerged turbine-draft tube device will be installed in the 95 foot deep silo to demonstrate deep tank mixing and aeration by a method requiring relatively low power and maintenance. Pre and post construction evaluation studies will be completed and reports prepared.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11023 (3-I11-1)**

TITLE OF PROJECT: **"Cook Street Storm Overflow Treatment Works"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Springfield Sanitary District **R.R. #5** **Springfield, Illinois**	**Mr. Ralph Christensen** **EPA, Region V** **One North Wacker Drive** **Chicago, Illinois 60606**

Project Site: **Springfield, Illinois**

DESCRIPTION OF PROJECT

Award Date: **June 28, 1966**	Project Cost: **$199,140**
Completion Date: **August 1970**	Federal Cost: **$ 86,570**

Summary: **This project consisted of the determination of the effectiveness of a 12-acre stabilization pond, receiving by-passed overflows, as a treatment device. Evaluation included routine sampling of influent and effluent, and biological examination of the pond and receiving stream. A Final Report on this project has been published entitled "Retention Basin Control of Combined Sewer Overflows"**

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 11024 DMS (14-12-200)

TITLE OF PROJECT: "Engineering Investigation for Control of Water Pollution from Combined Sewer Overflows"

GRANTEE OR CONTRACTOR:
Hayes, Seay, Mattern
and Mattern
P. O. Box 1490
Roanoke, Virginia 24007

EPA PROJECT OFFICER:
Dr. Raymond Thacker
EPA, Region III
6th & Walnut Streets
Philadelphia, Pennsylvania 19106

Project Site: Roanoke, Virginia

DESCRIPTION OF PROJECT

Award Date: August 16, 1968	Project Cost: $104,191
Completion Date: August 1970	Federal Cost: $104,191

Summary:

This project investigated overloaded sewer problems in Roanoke caused by stormwater entering the sanitary sewerage system. Preliminary plans for remedial measures, based on cost effectiveness, were prepared. A Final Report on this project has been published entitled "Engineering Investigation of Sewer Overflow Problems"

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 DOC (14-12-502)

TITLE OF PROJECT: "Optimization of Storm Water Pollution Control"

GRANTEE OR CONTRACTOR:
Metcalf & Eddy, Inc.
1029 Corporation Way
Palo Alto, California 94303

EPA PROJECT OFFICER:
Mr. Darwin Wright
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Palo Alto, California

DESCRIPTION OF PROJECT

Award Date: March 4, 1969
Project Cost: $253,800

Completion Date: October 1970
Federal Cost: $253,800

Summary:

This project consisted of the development of a comprehensive mathematical model capable of defining both quality and quantity runoff phenomena throughout the various stages of precipitation, collection, storage, treatment and points within the receiving streams of the basin. The model simulation ability was verified by field tests. This system is a much needed working tool for local governments in the management and control of stormwater pollution. The project was conducted in conjunction with projects 11024 EBI and 11024 EBJ. A Final Report has been published entitled "Storm Water Management Model, Volumes I-IV."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: **11024 DOK (WPD 217-01-68)**

TITLE OF PROJECT: **"Controlling Pollution from Combined Sewer Overflows and Storm Water by Electrode Potential"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Merrimack College **North Andover, Massachusetts**	**Mr. Warren Oldaker** **EPA, Region I** **John F. Kennedy Building** **Boston, Massachusetts -2203**

Project Site: **North Andover, Massachusetts**

DESCRIPTION OF PROJECT

Award Date: **December 20, 1968** Project Cost: **$45,413**

Completion Date: **March 15, 1970** Federal Cost: **$21,563**

Summary: **This project consisted of a laboratory feasibility investigation, utilizing an electrode potential measuring system, was made to indicate the strength of combined sewer overflows. This project will also study possibilities of incorporating the electrolytic curcuit into mechanical flow control schemes. A Final Report on this project has been published entitled "Proposed Combined Sewer Control by Electrode Potential"**

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5a (2) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 DQU

TITLE OF PROJECT: **"Urban Runoff Characteristics"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Cincinnati Cincinnati, Ohio 45221	Mr. Anthony N. Tafuri Edison Water Quality Laboratory Edison, New Jersey 08817

Project Site: Cincinnati, Ohio

DESCRIPTION OF PROJECT

Award Date: June 1, 1969 Project Cost: $163,865

Completion Date: November 30, 1972 Federal Cost: $163,865

Summary: This project will collect, for the first time, detailed information defining the physical characteristics of an urban drainage area tributary to a combined sewer drainage system and detailed data relating to the quantity and quality of various sources of pollution within the combined sewer drainage area. Generally in the past, data have been collected only at the actual overflow location from a drainage area. The collection and evaluation of data from within the tributary drainage area will provide valuable insights regarding methods for controlling the strength and volume of combined sewer overflows.

The data collected will be used to test evaluate and refine the EPA Storm Water Management Model.

An interim report entitled "Urban Runoff Characteristics" has been published.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 DZB (14-12-494)

TITLE OF PROJECT: "Develop a Suspended Solids Monitor"

GRANTEE OR CONTRACTOR:
American Standard Incorporated
P. O. Box 2003
New Brunswick, New Jersey 08903

EPA PROJECT OFFICER:
Mr. Allyn Richardson
EPA, Region I
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Project Site: New Brunswick, New Jersey

DESCRIPTION OF PROJECT

Award Date: March 28, 1969

Completion Date: September 1972

Project Cost: $128,417

Federal Cost: $121,946
+ 6,471 (6/72)
$128,417

Summary:

This project will develop and evaluate a suspended solids monitor for use in continuously measuring suspended solids in sewage. A new principal for such measurement, based on the measurement of light depolarization, will be utilized. Phase I of the project will determine feasibility of the technique, Phase II will accomplish design of the prototype instrument, Phase III will involve selection and bench-scale testing of optical components, and electronic components will be selected in Phase IV. Phase V will consist of field standardization and calibration of the prototype in a sewage environment. A final report on the project is pending.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 EBI (14-12-501)

TITLE OF PROJECT: "Optimization of Storm Water Pollution Control"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Water Resources Engineers, Inc. 1900 Olympic Boulevard Walnut Creek, California 94596	Mr. Darwin Wright Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Walnut Creek, California

DESCRIPTION OF PROJECT

Award Date:	March 4, 1969	Project Cost:	$114,860
Completion Date:	September 1970	Federal Cost:	$114,860

. Summary:

This project consisted of the development of a comprehensive mathematical model capable of defining both quality and quantity runoff phenomena throughout the various stages of precipitation, collection, storage, treatment and points within the receiving streams of the basin. The model simulation ability was verified by field tests. This system is a much needed working tool for local governments in the management and control of stormwater pollution. The project was conducted in conjunction with projects 1[illegible] DOC and 11024 EBJ. A Final Report has been published entitled "Storm Water Management Model, Volumns I-IV."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 EBJ (14-12-503)

TITLE OF PROJECT: "Optimization of Storm Water Pollution Control"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Florida Dept. of Environmental Engineering Gainesville, Florida 32601	Mr. Darwin Wright Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Gainesville, Florida

DESCRIPTION OF PROJECT

Award Date:	March 11, 1969	Project Cost:	$147,990
Completion Date:	March 1971	Federal Cost:	$147,990

Summary:

This project consisted of the development of a comprehensive mathematical model capable of defining both quality and quantity runoff phenomena throughout the various stages of precipitation, collection, storage, treatment and points within the receiving streams of the basin. The model simulation ability was verified by field tests. This system is a much needed working tool for local governments in the management and control of stormwater pollution. The project was conducted in conjunction with projects 11024 DOC and 11024 EBI. A Final Report has been published entitled "Storm Water Management Model, Volumns I-IV."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 ELB (14-12-458)

TITLE OF PROJECT: "An Engineering Investigation of Combined Sewer Problems of Atlanta, Georgia"

GRANTEE OR CONTRACTOR:

Black, Crow & Eidsness
1261 Spring Street, N.W.
Atlanta, Georgia 30309

EPA PROJECT OFFICER:
Mr. Asa B. Foster, Jr.
EPA, Region IV
1421 Peachtree Street, N.E.
Atlanta, Georgia 30309

Project Site: Atlanta, Georgia

DESCRIPTION OF PROJECT

Award Date: September 5, 1968

Completion Date: May 1970

Project Cost: $298,826

Federal Cost: $263,826
35,000 (3/72)
$298,826

Summary:

This project consisted of a detailed engineering investigation and comprehensive technical study of the South River Drainage Basin, Atlanta, Georgia, to: (1) evaluate the benefits, economics and feasibility of alternate schemes including separation, collection, storage and treatment for overflow or bypassed waste water from combined sewer systems, and the discharges of storm water collection systems, (2) correlate pollution load data with type of zoning and detailed land use and (3) develop methodology to relate storm water drainage in both quality and quantity to zoning classification. A Final Report on this project has been published entitled "Storm and Combined Sewer Pollution Sources and Abatement."

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 EQE (14-12-835)

TITLE OF PROJECT: "Impregnation of Concrete Pipe"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Southwest Research Institute 8500 Culebra Road San Antonio, Texas 78228	Mr. George Putnicki EPA, Region VI 1600 Patterson Street Dallas, Texas 75202

Project Site: San Antonio, Texas

DESCRIPTION OF PROJECT

Award Date:	March 10, 1970	Project Cost:	$50,735
Completion Date:	March 1971	Federal Cost:	$50,735

Summary:

The project investigated additives and coatings for concrete used for large diameter sewers for their ability to decrease permeability and increase resistance to chemical and bacterial attack while maintaining or improving physical and mechanical properties. A parallel area of investigation determined the optimum impregnating techniques from the cost effectiveness viewpoint. A Final Report on this project has been published entitled "Impregnation of Concrete Pipe."

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 EQG (14-12-407)

TITLE OF PROJECT: "Engineering Investigation of the East Bay Municipal Utility District of the San Francisco Bay Area (Oakland)"

GRANTEE OR CONTRACTOR:

Metcalf and Eddy, Inc.
1029 Corporation Way
Palo Alto, California 94303

Project Site: Oakland, California

EPA PROJECT OFFICER:

Mr. John C. Merrell, Jr.
Region IX, Environmental Protection Agency
100 California Street
San Francisco, California 94111

DESCRIPTION OF PROJECT

Award Date: June 29, 1968

Completion Date: November 1970

Project Cost: $141,300

Federal Cost: $141,300

Summary:

Engineering investigation was conducted on storm water infiltration into sanitary sewers and associated problems in the East Bay Municipal Utility District, Special District No. 1. Rainfall and sewer flow data were obtained in selected study subareas that characterized the land use patterns predominant in the study area. Results obtained were extrapolated over larger drainage areas. A computerized flow routing program for the sewer system was used in this analysis.

A Final Report has been published on this project entitled "Storm Water Problems and Control in Sanitary Sewers - Oakland and Berkeley, California."

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(1),
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11024 EVQ

TITLE OF PROJECT: "Wastewater Flow Measurement in Sewers Using Ultrasound"

GRANTEE OR CONTRACTOR:
Sewerage Commission of the City of Milwaukee
P. O. Box 2079
Milwaukee, Wisconsin 53201
Project Site:
Milwaukee, Wisconsin

EPA PROJECT OFFICER:
Mr. Clifford Risely
Director, Research and Monitoring
Environmental Protection Agency
Region V
1 N. W. Wacker Drive
Chicago, Illinois 60606

DESCRIPTION OF PROJECT

Award Date: 3/26/71

Completion Date: 7/1/72

Project Cost: $192,283

Federal Cost: $144,212

Summary: The objective of this project is to install, demonstrate, and evaluate newly developed ultrasonic velocity measurement equipment, in conjunction with off-the-shelf ultrasonic level measurement equipment, for measurement of sewage volume flow. The equipment is said to be of sufficiently low cost to achieve general use, can be conveniently installed in sewers, will require minimal maintenance, and will be suited to long term operation in the sewer environment.

Two existing sewers in the Milwaukee sewerage system, one twelve and one-half feet and the other five feet in diameter, will be thus equipped. Performance of the ultrasonic meters will be compared with other metering devices and methods presently used in the system.

Relationships between average volume flow, water level, and average velocity along selected horizontal chords of the sewer cross-sections will be determined. From these a procedure will be developed for automatic calculation of sewage volume flow from signal inputs of chordal velocity and water level. A continuous record of flow will be displayed.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 EXF (14-12-403)

TITLE OF PROJECT: "Develop and Demonstrate a Method for Assessing the Extent of Pollution from Storm Water Runoff in an Urban Area"

GRANTEE OR CONTRACTOR:
Roy F. Weston, Inc.
1426 Lewis Lane
West Chester, Pennsylvania 19380

EPA PROJECT OFFICER:
Dr. Raymond Thacker
EPA, Region III
6th and Walnut Streets
Philadelphia, Pennsylvania 19106

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date: June 29, 1968

Completion Date: February 1970

Project Cost: $229,525

Federal Cost: $223,514
6,011 (12/69)
$229,525

Summary:

This project investigated combined sewer overflow problems from a 25 square mile drainage area in the District of Columbia. Alternate corrective approaches were investigated with emphasis on chemical flocculation and high rate filtration. The "deep tunnel" storage concept was also considered. Laboratory research was conducted to determine the efficiency of removing solids and BOD by this process. A Final Report has been published on this project entitled "Combined Sewer Overflow Abatement Alternatives."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1 Contract
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11024 EYF (14-12-909)

TITLE OF PROJECT: "A Portable Devise for Measuring Wastewater Flow in Sewers"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hittman Associates, Inc. P. O. Box 810 Columbia, Maryland 21043	Dr. H. R. Thacker EPA, Office of Research and Monitoring Washington, D.C. 24060

Project Site: Columbia, Maryland

DESCRIPTION OF PROJECT

Award Date: August 11, 1970	**Project Cost:** $137,200
Completion Date: May 11, 1972	**Federal Cost:** $137,200

Summary: This project is to design, fabricate, and test an improved device for measuring wastewater flow in sewers, particularly to meet the very severe requirements for measuring and recording flows in storm sewers and in combined sewers. The objective is to develop a device which will be capable of measuring a full range of open-channel flow in a closed conduit, and flow with the conduit flowing full and under pressure. Its operation is not to be seriously affected by the movement of solids such as sand, gravel, and debris within the fluid flow, and capability for installation in confined and moisture-laden spaces such as sewer manholes is necessary. Ultimate reasonable production cost, and a 5 percent plus or minus accuracy are planned.

The device to be developed depends on the unique properties of the electrical capacitance of a sewer cross-section, with the wastewater forming a portion of the dielectric. Velocity is measured by the steam induced heat pulse tracer technique.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FEJ (14-12-402)

TITLE OF PROJECT: "An Engineering Investigation of Storm and Combined Sewer Problems"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Henningson, Durham & Richardson, Incorporated 3555 Farman Street Omaha, Nebraska 68131	Mr. Ralph Christensen EPA, Region V 1 North Wacker Drive Chicago, Illinois 60606

Project Site: Des Moines, Iowa

DESCRIPTION OF PROJECT

Award Date: June 28, 1968	Project Cost: $333,285
Completion Date: July 1972	Federal Cost: $333,285

Summary:

This project consisted of a study of storm and combined sewer overflows in Des Moines, Iowa included field investigation to pinpoint and assess existing problems and recommended alternate solutions based on cost, effectiveness. The solutions included surge or retention basins, percolation basins, clarification, and utilization of flood control facilities and existing channels. Estimates for sewer separation were also developed. A Final Report is being published on this project.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FIU (14-12-907)

TITLE OF PROJECT: "Vibratory Sewer Flowmeter"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Anatole J. Sipin Company 1140 Broadway New Yor, New York 10001	Mr. Robert B. Dona Environmental Protection Agency Region II Rochester Field Office P. O. Box 4748 Rochester, New York 14612

Project Site:
New York, New York

DESCRIPTION OF PROJECT

Award Date: 8/25/70	Project Cost: $57,994
Completion Date: 10/25/71	Federal Cost: $57,994

Summary: This project is to design, fabricate, and test a prototype 12-inch vibratory sewer flowmeter capable of meeting the very severe requirements for measuring and recording flows in storm sewers and in combined sewers. The objective is to develop a device which can measure a full range of open-channel flow in a closed conduit, and flow with the conduit flowing full and under pressure. Its operation is not to be seriously affected by the movement of solids such as sand, gravel, and debris within the fluid flow, and capability for installation in confined and moisture-laden spaces such as sewer manholes is necessary. Ultimate reasonable production cost, and a 5 percent plus or minus accuracy are planned.

The flowmeter to be developed will operate on the principle that the reaction of flowing material to a mechanical vibration applied to the stream boundary in a direction transverse to the direction of flow is a direct measure of mass flow rate. The essential elements are an actuator to impart a vibratory force or motion to the flowing material, and a sensor to measure the reaction.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FJE (14-12-904)

TITLE OF PROJECT: "Continuous Survey of the Literature to Storm and Combined Sewers

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Franklin Institute Research Laboratory Benjamin Franklin Parkway Philadelphia, PA 19103	Mr. Darwin Wright Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: June 26, 1970	Project Cost: $17,303
Completion Date: June 1971	Federal Cost: $17,303

. Summary:

This project consists of the publication entitled "Selected Urban Storm Water Runoff Abstracts". It is a integration of abstract material summarizing articles from a variety of technical publications covering subjects pertinent to the problem of urban drainage.

The edition includes 234 abstracts of documents published for the most part from July 1970 through July 1971. For convenience, the abstracts are classed in ten categories and arranged alphabetically by author and numerically by abstract number within each category.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FKJ (14-12-180)

TITLE OF PROJECT: "Role of Solids in Combined Sewage Pollution"

GRANTEE OR CONTRACTOR:
Aeroject - General
Corporation
9200 East Flair Drive
El Monte, California 91734

Project Site: El Monte,
California

EPA PROJECT OFFICER:
Mr. John Merrell, Jr.
Environmental Protection Agency
Region IX
100 California Street
San Francisco, California 94111

DESCRIPTION OF PROJECT

Award Date: June 20, 1968

Completion Date: June 1970

Project Cost: $92,605

Federal Cost: $92,605
- 200 7/70
$92,405

Summary:

This project evaluated the feasibility and potential benefits obtained by solids removal by in-sewer screening devices. The effect on chlorination requirements resulting from solids removals was also investigated. An evaluation was made between aesthetic water quality considerations and proposed state water quality standards for water bodies receiving combined overflows. A Final Report on this project has been published entitled "In-Sewer Fixed Screening of Combined Sewer Overflows."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FKM (14-12-197)

TITLE OF PROJECT: "A Method for Assessing the Extent of Pollution from Storm Water Runoff from an Urban Area"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Aerojet-General Corporation Environmental Systems Division 9200 East Flair Drive El Monte, California	Mr. John C. Merrell, Jr. Region IX, Environmental Protection Agency 100 California Street San Francisco, California 94111

Project Site: Sacramento, California

DESCRIPTION OF PROJECT

Award Date:	June 29, 1968	Project Cost:	$402,594.00
Completion Date:	December 1971	Federal Cost:	$402,594.00

Summary:

A general method was developed to assess, primarily from readily available precipitation and wastewater quality data, the extent of water pollution occurring from storm water runoff and combined sewer overflows in an urban area. Systems for the control and treatment of these wastewaters are developed and evaluated. The method was applied to Sacramento, California.

It was determined, in this case, that separation of combined and storm sewers was the best solution, though slightly more costly.

A Final Report has been published on this project entitled "Urban Storm Runoff and Combined Sewer Overflow Pollution - Sacramento, California."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FKN (14-12-401)

TITLE OF PROJECT: "Develop the Relation Between Land-Use Practices and Incidence of Pollution in Urban Stormwater"

GRANTEE OR CONTRACTOR:

Burgess & Niple, Limited
2015 West Fifth Avenue
Columbus, Ohio 43212

EPA PROJECT OFFICER:
Mr. Alfred Smith
EPA, Region V
Lake Erie Basin Office
21929 Lorain Road
Cleveland, Ohio 44126

Project Site: Bucyrus, Ohio

DESCRIPTION OF PROJECT

Award Date: June 27, 1968

Project Cost: $136,665

Completion Date: May 1970

Federal Cost: $136,665

Summary:

This project investigated combined sewer problems and evaluated the benefits, economics and feasibility of collection and treatment of combined sewer overflows in Bucyrus, Ohio. Corrective plans considered storage concepts, physical and chemical treatment, partial sewer separation and possible sewage treatment plant modifications. A Final Report on this project has been published entitled "Stream Pollution and Abatement from Combined Sewer Overflows."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 FLY (14-12-854)

TITLE OF PROJECT: "New Pipe Joint System"

GRANTEE OR CONTRACTOR:
The Western Company
2201 N. Waterview Parkway
Richardson, Texas 75080

EPA PROJECT OFFICER:
Mr. George Putnicki
EPA, Region VI
1600 Patterson Street
Dallas, Texas 75202

Project Site: Richardson, Texas

DESCRIPTION OF PROJECT

Award Date: May 4, 1970

Project Cost: $52,643

Completion Date: May 1971

Federal Cost: $52,643

Summary:

This project will construct and evaluate a heat shrinkable sewer pipe jointing device. The goal is to develop the best over-all design and material for a flexible, leak proof, long lasting, easily installed and economically reasonable pipe joint. The performance reliability and economics is compared to conventional joints. A Final Report on this project has been published entitled "Heat Shrinkable Tubing as Sewer Pipe Joints."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11024 GRF (68-01-0062)

TITLE OF PROJECT: "Electromagnetic Soil Profiling"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Geophysical Survey Systems, Inc. 16 Republic Road North Billerica, Massachusetts	Mr. Allyn Richardson EPA, Region I John F. Kennedy Federal Building Boston, Massachusetts 02203

Project Site: North Billerica, Massachusetts

DESCRIPTION OF PROJECT

Award Date: May 6, 1971 Project Cost: $46,938

Completion Date: February 1972 Federal Cost: $46,938

Summary:

This project consists of an investigation into the feasibility of utilizing a remote sensing technique consisting of a pulsed radar system capable of penetrating soil to depths of 10 to 20 feet. The system will provide a chart record of the dielectric interfaces detected by the radar signal as the radiating and receiving antenna is moved across the ground. The objective is to evaluate a new surveying instrument which will provide accurate subsurface information with respect to the location of rock, pipe, obstacles and other anomalies. If successful this instrument would have wide application in determining subsurface conditions and thereby more reliable cost estimating for laying and repairing sewer lines. Another broad application would be in non-destructive testing for such things as locating reinforcing bars.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11030 DNK (14-12-20)

TITLE OF PROJECT: "System Study Design and Evaluation of Local Storage Treatment and Reuse of Storm Water"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hittman Associates, Inc. P. O. Box 810 Columbus, Maryland 21043	**Mr. Sidney Beeman** Office of Research and Monitoring Environmental Protection Agency Washington, D.C. 20460

Project Site: Columbia, Maryland

DESCRIPTION OF PROJECT

Award Date: July 25, 1967   Project Cost: $197,724

Completion Date: August 1968   Federal Cost: $197,724

Summary: The project investigated the feasibility of utilizing collection of runoff, storage, treatment and possible reuse as a means of controlling pollution caused by stormwater runoff. Various types of local storage were explored and the potential of reusing stored waters, including consideration of sanitary, legal, and socio-economic aspects were evaluated. The project was carried out on a small watershed in Columbia, Maryland.

A Final Report has been published on this project, entitled "Beneficial Uses of Storm Water."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)1 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11031 DSA (WPRD-249-01)

TITLE OF PROJECT: "Demonstration Project for Temporary Detention of Storm and Combined Sewage in Natural Underground Formations"

GRANTEE OR CONTRACTOR:
City of South St. Paul
Minnesota 55075

EPA PROJECT OFFICER:
Mr. Clarence Oster
EPA, Region V
7401 Lyndale Avenue S
Minneapolis, Minnesota 55423

Project Site: South St. Paul, Minnesota

DESCRIPTION OF PROJECT

Award Date: July 22, 1968

Project Cost: $380,000

Completion Date: Dec. 1969

Federal Cost: $285,000

Summary: This project was intended to demonstrate the use of natural temporary storage of both storm water and combined storm water and sewage during periods of storm water runoff. Phase I of the project, to locate permeable formations for temporary storage, determined that limited storage capacity was available, and the project was terminated. A Final Report is pending.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11030 FLN

TITLE OF PROJECT: "Development of the RRL Method of Storm Sewer Design"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Illinois Urbana, Illinois 61801	Harry C. Torno Office of Research & Monitoring Environmental Protection Agency Washington, D. C. 20460

Project Site: Urbana, Illinois

DESCRIPTION OF PROJECT

Award Date:	June 24, 1970	Project Cost:	$64,336
Completion Date:	June 1972	Federal Cost:	$19,102

Summary:

The objective of this project is to provide a catalog of actual applications on 10 urban basins in the United States of the British Road Research Laboratory method (RRL method) for the design or redesign of storm sewers.

Project personnel would travel from Urbana, Illinois, to each of about 10 selected cities to negotiate and obtain from the files of these cities records of rainfall and storm runoff measured over a period of years from an urban basin served by a sewer system. They would obtain maps of the size, location, and slope of all existing storm sewers in each urban basin; a street map of each urban basin; and an aerial photograph covering each urban basin.

All of this physical data would be processed by digital computer for each of 10 urban basins to provide suitable procedures for determining storm runoff utilizing the British RRL method. The results from these 10 basins would be generalized to aid engineering judgement in the further application of the method for the design of storm sewers or evaluation of inadequacies of existing storm sewer systems in the United States.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11030 HJP

TITLE OF PROJECT: "Characterization and Treatment of Urban Land Runoff"

GRANTEE OR CONTRACTOR:
Water Resources Research Inst.
124 Riddick Building
North Carolina State University
Raleigh, North Carolina 27607

EPA PROJECT OFFICER:
Anthony N. Tafuri
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: Durham, North Carolina

DESCRIPTION OF PROJECT

Award Date: July 1, 1971

Completion Date: June 30, 1973

Project Cost: $119,688

Federal Cost: $106,672

Summary: A 1.67 square mile drainage area in Durham, North Carolina, will be monitored over a two year period for the purpose of correlating storm water discharge quality with land use, rate of flow, storm characteristics, and runoff time. Laboratory pilot-scale studies will be conducted to evaluate the applicability, effectiveness, and economics of sedimentation and physiochemical treatment of storm water discharges. Water quality management criteria will be developed to evaluate the relationship of storm water discharge control/treatment versus advanced municipal waste treatment; in terms of cost and effectiveness to meet desired water quality levels.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 68-01-0173

TITLE OF PROJECT: "Revision of a Report entitled "The Beneficial Use of Storm Water"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hittman Associates, Inc. P. O. Box 810 9190 Red Branch Road Columbia, Maryland 21043	Mr. Sidney Beeman Environmental Protection Agency Office of Research and Monitoring Washington, D.C. 20460

Project Site: Columbia, Maryland

DESCRIPTION OF PROJECT

Award Date: February 24, 1972	Project Cost: $8,750
Completion Date: April 1972	Federal Cost: $8,750

Summary:

This project consists of the following major revisions to the report entitled "Beneficial Use of Storm Water:" 1) The present appendices, with the exception of Appendix A, will be eliminated and any information necessary will be included in the basic report 2) Testing and Sampling results and Costs will be included as Appendices 3) Demonstration program section will be eliminated and a new section will be added which discusses scope and objectives of EPA grant #15030 FMZ . A Final Report on this project is pending.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11032 DTI

TITLE OF PROJECT: **"Evaluation of the Various Aspects of an Aluminum Storm Sewer System"**

GRANTEE OR CONTRACTOR:
City of LaSalle
LaSalle, Illinois 61301

EPA PROJECT OFFICER:
Mr. Clifford Risley, Director
R&D Programs
Region V
1 N.W. Wacker Drive
Chicago, IL 60606

Project Site: La Salle, Illinois

DESCRIPTION OF PROJECT

Award Date: June 23, 1969
Project Cost: $988,068

Completion Date: January 1, 1973
Federal Cost: $454,776

Summary: The objectives are: a) Investigate and determine the performance and durability of aluminum pipe used as storm drains, b) An evaluation of installed aluminum pipe costs, c) Flow tests utilizing two corrugation configurations, d) Development and evaluation of coupling system for water tight joints and e) Development and evaluation of appurtenances such as manholes, tapping saddles and catchbasins with the intent of utilizing and prefabricating to the extent possible.

The proposed work includes the installation of 18,300 lineal feet of various sized corrugated aluminum storm sewers and investigation of the performance, dependability and durability of this material for use in storm drainage systems. Investigations relating to flow properties under field conditions, pipe jointing, attendant equipment, and installed cost will be made.

Work will be performed at St. Anthony Falls, Minnesota, at Pittsburgh Testing Laboratory at Pittsburgh, Pa. and at the office of Dr. Morse at Elpaso, Illinois, as well as at the City of LaSalle.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11032 GQG (68-01-0168)

TITLE OF PROJECT: "Friction Reducing Additive Effects on Open Channel Flow

GRANTEE OR CONTRACTOR:
Columbia Research Corp.
P O. Box 485
Gaithesburg, Maryland 20760

EPA PROJECT OFFICER:
Mr. James Newson
Environmental Protection Agency
Region II
P. O. Box 12900
Philadlphia, Pennsylvania 19108

Project Site:
Gaithesburg, Maryland
DESCRIPTION OF PROJECT

Award Date: 1/24/72
Project Cost: $65,000

Completion Date: 12/24/72
Federal Cost: $65,000

Summary: This project is for an analytical and experimental program to determine the effects of polymer additives on open channel turbulent flow. The program will extrapolate the data of previous investigations of additive effects on flow in completely filled pipes and on flat plates to the open channel flow problem. These extrapolations will be substantiated through experimental model studies. The results of the program will be a set of parametric curves which indicate the effectiveness of friction reducing additives on open channel flow as a function of channel geometry, slope, and polymer concentration.

In addition, a study will be made to determine polymer additive effectiveness on energy dissipaters such as jumps and spillways (considering their use as flow measuring devices and as overflow regulators).

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)(1) Contract
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11034 DUY (14-12-924)

TITLE OF PROJECT: "Investigation of Porous Pavement"

GRANTEE OR CONTRACTOR:
The Franklin Institute
Research Laboratory
The Ben Franklin Parkway
Philadelphia, Pa. 19103

EPA PROJECT OFFICER:
Mr. I. Seidenberg
Environmental Protection Agency
Edison Water Quality Laboratory
Edison, New Jersey 08817

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: October 30, 1970 Project Cost: $123,815

Completion Date: October 1971 Federal Cost: $123,815

Summary: This project consists of laboratory and economic studies to determine the feasiblity of utilizing porous pavements to alleviate combined sewer overflow pollution and reduce the design parameter of storm sewer system by allowing storm runoff to percolate back into the soil.

Materials testing for stability, durability, and freeze-throw susceptibility revealed a porous asphaltic concrete suitable for use in road construction. Roads designed with this material were found to be generally more economical than conventional roads with storm sewers. A Final Report on this project has been published entitled "Investigation of Porous Pavements for Urban Runoff Control".

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11034 FKL (14-12-187)

TITLE OF PROJECT: "Develop the Relation Between Land-Use Practices and Incidence of Pollution in Urban Stormwater"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
AVCO - Economics Systems Corporation 1025 Connecticut Avenue, N.W. Washington, D. C. 20036	Mr. George Putnicki EPA, Region VI 1600 Patterson Street Dallas, Texas 75202

Project Site: Tulsa, Oklahoma

DESCRIPTION OF PROJECT

Award Date:	June 13, 1968	Project Cost:	$119,281
Completion Date:	February 1970	Federal Cost:	$114,300 4,981 (1/70) $119,281

Summary:

This project consisted of an investigation of the pollution concentrations and loads from storm water runoff in an urban area. The scope of the project included: a field assessment of the storm water pollution by obtaining samples of the water resulting from precipitation and surface runoff; development of an analytical procedure for correlation of storm water pollution with selectively defined variables of land uses, environmental conditions, drainage characteristics, and precipitation; and development of a plan for implementing remedial measures necessary to abate or control sources of pollution in an urban area. Storm water runoff samples were collected from 15 "discrete" test areas in the Tulsa, Oklahoma, metropolitan area for laboratory analysis in terms of quality standards for BOD, COD, TOC, organic Kjeldahl nitrogen, soluble orthophosphate, chloride, pH, solids, total coliform, fecal coliform, and fecal streptococcus pollutants. A Final Report has been published on this project entitled "Storm Water Pollution from Urban Land Activity."

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 Contract ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11034 FLU (14-12-861)

TITLE OF PROJECT: "Flow in Long Vertical Conduits with Reference to Design of Storm Water Dropshafts"

GRANTEE OR CONTRACTOR:
University of Minnesota
Morrill Hall
Minneapolis, Minnesota 55455

EPA PROJECT OFFICER:
Mr. Clarence Oster
EPA, Region V
Lake Superior Basin Office
7401 Lyndale Avenue
Minneapolis, Minnesota 55455

Project Site: Minneapolis, Minnesota

DESCRIPTION OF PROJECT

Award Date: May 5, 1970

Project Cost: $41,372

Completion Date: July 1971

Federal Cost: $41,372

Summary:

This project consisted of an investigation into the nature of flow in long vertical dropshafts and to provide design data leading to a large-scale model study of dropshafts to transport surface runoff and combined sewage to deep tunnel reservoirs. A Final Report on this project has been published entitled "Hydraulics of Long Vertical Conduits and Associated Cavitation."

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a(1) Contract, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11034 FUJ (14-12-921)

TITLE OF PROJECT: "Water Pollution Effects of Street Surface Contaminants"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
URS Research Company 155 Bovet Road San Mateo, California 94402	Mr. Frank Condon Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: San Mateo, California

DESCRIPTION OF PROJECT

Award Date:	June 30, 1970	Project Cost:	$263,342
Completion Date:	November 1971	Federal Cost:	$263,342

Summary:

This project is to investigate and define the impacts of urban surface runoff and to develop alternate approaches to abating pollution from this source. Principal objectives are to: (1) determine state-of-the-art of street cleaning; (2) develop a means of assessing significant pollutants not usually captured by conventional sampling; (3) develop a standard procedure for assessing equipment and practice performance in terms of pollution control; and (4) define required improvements for street cleaning devices.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 11040 DRS (WP-00843-04)

TITLE OF PROJECT: "Rainfall-Runoff Relations on Urban and Rural Area"

GRANTEE OR CONTRACTOR:
The Regents of the
University of Michigan
3014 Administration Building
Ann Arbor, Michigan 48104

Project Site: Ann Arbor
Michigan

EPA PROJECT OFFICER:
Mr. Robert M. Buckley
Environmental Protection Agency
Region 5
Michigan District Office
9311 Groh Road
Grosse Ile, Michigan 48138

DESCRIPTION OF PROJECT

Award Date: 7/8/70

Project Cost: $64,866

Completion Date: 1/73

Federal Cost: $18,986 - 9/69
$21,158 - 6/70
$21,383 - 2/72

Summary:

Objectives of the project are to gain a better understanding of the factors which control the relationship between storm rainfall, or snowmelt, and the resulting storm runoff, and to determine the effect of urbanization on this runoff process. The benefits would include prevention of flood damage by means of improved design of storm sewers and waterways, and would provide data needed for the improved design and operation of facilities for control of pollution due to storm water and/or combined sewage.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a (1) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 11040 GYJ

TITLE OF PROJECT: "Urban Runoff Pollution from Roadways"

GRANTEE OR CONTRACTOR:
Biospherics, Incorporated
4928 Wyaconda Road
Rockville, Maryland 20852

EPA PROJECT OFFICER:
Francis J. Condon
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Rockville, Maryland

DESCRIPTION OF PROJECT

Award Date: April 24, 1972 Project Cost: $218,200

Completion Date: October 24, 1973 Federal Cost: $218,200

Summary:

The major objectives of this effort are to delineate overall pollution loads to stormwater runoff resulting from vehicular traffic and roadway usage; to determine the specific impact and contribution of motor vehicles as differentiated from other sources of pollution to the roadway environment; to analyze collected dust and dirt fractions and flush water for conventional, non-conventional, and toxic waste components; to determine the origin of pollutants as to the particular part or operational mode of motor vehicles causing these pollutants; and most important, to develop recommendations for general and specific control measures to abate pollution in the roadway (and roadside) environment.

The project will be an important definitive work directly bearing on on-going and future R&M efforts dealing with urban storm water pollution. The findings will be significant in determining future joint city/state actions for overall pollution prevention and control.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

WATER QUALITY CONTROL

4-A

WATER QUALITY CONTROL

The National Water Quality Control Research Program is responsible for conceiving, developing, and field testing methodology for the improvement of water quality by means other than conventional waste treatment. This includes, but is by no means limited to: research on methods of modifying environmental conditions to minimize or reduce pollutional effects; changes in product technology to eliminate or reduce pollutants; techniques of managing waste discharges and their receiving waters to minimize pollutional effects; and the utilization of soil for the treatment of liquid wastes and sludges.

The activities of the Program are divided into the following four areas according to common methodology and objectives:

Soil Treatment Technology--Research and development related to the utilization of soils for the treatment of liquid wastes and sludges. Research includes the adaptability of different soil systems to the treatment of various wastes, microbiological processes involving soil bacteria, physical-chemical interactions of pollutants with soils, the development of the concepts of soil-sludge interactions, and the development of design and operating criteria for practical application.

Environmental Control Technology--Research to provide the technology to minimize or reduce pollutional effects through modification of environmental conditions such as in-stream aeration, reservoir destratification, in situ chemical treatment, and control of pollution from bottom sediments; and research into methodologies for minimizing pollutional effects by managing waste discharges and/or their receiving waters such as by dispersion, eteention, diversion, dilution, or flow regulation.

Biological/Ecological Control Technology--Research directed to the development of treatment applications, environmental management, and ecological technology development. This includes the development of non-conventional biological mechanisms for treatment of point-source pollutants, development of regulatory mechanisms to achieve a greater measure of control of the aquatic food chain to diminish the adverse effects of non-point-source pollutants, and development of ecological technology to maximize protection and utilization of aquatic resources.

Product Control Technology--Research related to the control of pollution from multiple sources by modification of consumer products.

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PPB 16080 - Water Quality Control

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ERP	Washington State University	D	4-13
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*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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Final Reports Available

PPB 16080 - Water Quality Control

Report Number	Title/Author	Source
16080---00/68	Pilot Study of Dynamics of Reservoir Destratification; by L. E. Leach, W. R. Duffer, and C. C. Harlin, Jr., Robt. S. Kerr Water Research Center, FWPCA, Ada, Oklahoma	NTIS - PB 205 825
16080---01/68	Agricultural Utilization of Sewage Effluent and Sludge: An Annotated Bibliography; by James P. Law, Robt. S. Kerr Water Research Center, FWPCA, Ada, Oklahoma	GPO - 45¢
16080---06/69	Hydraulic and Mixing Characteristics of Suction Manifolds; by Univ. of Washington, Seattle, Washington	NTIS - PB 190 800
16080---10/69	Nutrient Removal from Enriched Waste Effluent by the Hydroponic Culture of Cool Season Grasses; by James P. Law, Robt. S. Kerr Water Research Center, Ada, Oklahoma	GPO - 50¢
16080---11/69	Nutrient Removal from Cannery Wastes by Spray Irrigation of Grassland; by James P. Law, et al., Robt. S. Kerr Water Research Center, Ada, Oklahoma	NTIS - PB 189 774
16080---10/70	Induced Hypolimnion Aeration for Water Quality Improvement of Power Releases; by Lowell E. Leach, et al., Robt. S. Kerr Water Research Center, EPA, Ada, Oklahoma	GPO - 50¢
16080---11/70	Induced Aeration of Small Mountain Lakes; by Robt. S. Kerr Water Research Center, EPA, Ada, Oklahoma	GPO - 65¢
16080DFO01/71	Water Quality Control Through Flow Augmentation; by Heidelberg College, Tiffin, Ohio	GPO - $1.50
16080DMP03/71	Interactions of Herbicides and Soil Microorganisms; by Boyce Thompson Institute for Plant Research, Inc., Yonkers, N. Y.	In Press
16080DOO07/70	Optimum Mechanical Aeration Systems for Rivers and Ponds; by Littleton Research and Engineering Corp., Littleton, MA	GPO - $1.25

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Report Number	Title/Author	Source
16080DRX10/69	Stratified Reservoir Currents; by Oregon State Univ., Corvallis, Oregon	NTIS - PB 193 026
16080DUP12/70	Oxygen Regeneration of Polluted Rivers; The Delaware River; by Rutgers Univ., New Brunswick, New Jersey	GPO - $1.00
16080DVF12/70	Development of Phosphate-Free Home Laundry Detergents; by IIT Research Insti., Chicago, Illinois	GPO - $1.00
16080DVF02/72	Technical Evaluation of Phosphate-Free Home Laundry Detergents; by H. G. Reilich, IIT Research Instit., Chicago, Illinois	GPO - $1.25
16080DWP11/70	Induced Air Mixing of Large Bodies of Polluted Water; by Univ. of Maine, Orono, Maine	GPO - 60¢
16080FSN10/71	Engineering Methodology for River and Stream Reaeration; by JBF Scientific Corp., Burlington, Mass.	GPO - $1.25
16080FYA03/71	Oxygen Regeneration of Polluted Rivers: The Passaic River; by Rutgers Univ., New Brunswick, New Jersey	GPO - 65¢
16080GGH08/71	Changes in Water Quality Resulting from Impoundment; by W. R. Duffer, C. C. Harlin, Jr., Robert S. Kerr Water Research Center, EPA, Ada, Oklahoma	GPO - $1.25
16080GGP07/71	Effects of Feedlot Runoff on Water Quality of Impoundments; by Wm. R. Duffer, R. Douglas Kreis, and Curtis C. Harlin, Jr., Robert S. Kerr Water Research Center, EPA, Ada, Oklahoma	GPO - 65¢
16080GPF03/71	Corrosion Potential of NTA in Detergent Formulations; by Battelle Columbus Lab., Columbus, Ohio	GPO - $1.00
16080GWF02/72	Soil Systems for Municipal Effluents -- A Workshop and Selected References; by R. H. Ramsey, C. R. Wetherill, H. C. Duffer; East Central State College, Ada, Oklahoma	GPO - 65¢

Report Number	Title/Author	Source
16080HTD03/72	Mercury Pollution Control in Stream and Lake Sediments; by Advanced Technology Center, Inc., Dallas, Texas	In Press
16080HTZ03/72	Polymer Film Overlay System for Mercury Contaminated Sludge--Phase I; by Battelle Columbus Laboratories, Columbus, Ohio	In Press
16080HUB02/72	Waste Wool as a Scavenger for Mercury Pollution in Waters; by Arthur D. Little, Inc., Cambridge, Mass.	In Press
16080HVA01/72	Sand and Gravel Overlay for Control of Mercury in Sediments; by Martin Marietta Corporation, Research Institute for Advanced Studies, Baltimore, Maryland	In Press

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 DMP (16060 DMP)

TITLE OF PROJECT: "Interaction of Herbicides and Soil Microorganisms"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Boyce Thompson Institute for Plant Research Yonkers, New York 10701	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Yonkers, New York

DESCRIPTION OF PROJECT

Award Date:	December 1, 1967	Project Cost:	$105,393 (Total) 57,294 (5th & Terminal)
Completion Date:	January 31, 1970	Federal Cost:	50,028 (5th & Terminal)

Summary:

(1) To isolate and characterize microbial species responsible for complete or partial herbicide degradation;
(2) To characterize in simple culture media the comparative degradation of a large number of structurally related herbicides, analogues, and presumed degradation products; and
(3) To determine the feasibility of utilizing effective microorganisms in the decontamination of soil and water.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 DPC

TITLE OF PROJECT: "Water-Quality Regimen of Tahoe-Truckee System"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Center for Water Resources Research Desert Research Institute University of Nevada System Reno, Nevada 89507	Mr. John T. Marlar Environmental Protection Agency, Region IX 100 California Street San Francisco, California 94111

Project Site: Reno, Nevada

DESCRIPTION OF PROJECT

Award Date: August 3, 1970
Project Cost: $52,140

Completion Date: June 29, 1971
Federal Cost: $46,359

Summary:

The principal objective is development of a digital simulation model which will simulate inorganic water-quality records under various regimes of flow and waste disposal in complex hydrologic systems which include ground-water and dispersed components. A second objective is to develop methodology for building a water-quality model from intensive, short-term water-quality records. Although the model is being developed on the Tahoe-Truckee system, basic concepts used in its formulation are independent of the system, permitting transfer of the conceptual model to similar hydrologic systems. Application of the model to the Tahoe-Truckee system will have the side benefit of enabling evaluation of the effects of man's actions to manage flow and water quality or to degrade water quality in the Truckee system.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 DVF (14-12-937)

TITLE OF PROJECT: "Development of Phosphate-Free Home Laundry Detergents"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
IIT Research Institute Technology Center Chicago, Illinois 60616	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date:	October 22, 1970	Project Cost:	$118,338
Completion Date:	November 21, 1971	Federal Cost:	$118,338

Summary:

The purpose of this project is to develop model formulations of heavy-duty household detergents free of phosphates. Work is to concentrate on the three most successful surfactants studied under previous Contract No. 14-12-575. Synthesis of these surfactant compounds will be scaled-up to provide kilogram quantities which will be sufficient to allow extensive testing. Studies will be conducted to ascertain the effects of varying the chain lengths of at least one of the three surfactants. Extensive testing will be conducted to determine the "biological compatability" of the surfactant candidates, including toxicity and biodegradability studies.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 EIT

TITLE OF PROJECT: "Denitrification in Soil During Wastewater Disposal"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
The Pennsylvania State University University Park, Pennsylvania	Mr. Richard Thomas Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: University Park, Pennsylvania

DESCRIPTION OF PROJECT

Award Date:	December 4, 1970	Project Cost:	$28,917
Completion Date:	August 31, 1971	Federal Cost:	$27,471

Summary:

It is the major purpose of this project to find means of stimulating and forcing the denitrification process. The project has the following specific aims:

1. To develop a simple applicable and reproducible method for the determination of the denitrifying power of an eco-system under field conditions.

2 To investigate the pathway of nitrate reduction by various isolated soil microorganisms.

3. To study the effects under controlled laboratory conditions of individual variables and their interactions on the denitrification process with isolated denitrifiers, microbial communities and soil.

4. To study possible means of stimulating the denitrifying power of the soil eco-system.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Ac 84-660), as amended.

PROJECT NUMBER: 16080 ERP

TITLE OF PROJECT: "Correlated Studies of Vancouver Lake--Hydraulic Model Study"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Washington State University Pullman, Washington 99163	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Pullman, Washington

DESCRIPTION OF PROJECT

Award Date: September 16, 1969	Project Cost: $56,209
Completion Date: March 15, 1971	Federal Cost: $52,376

Summary:

The principal objective of this project is to develop as complete an analysis as possible of the best methods for introducing "purer" water into Vancouver Lake from the Columbia River so as to establish and maintain higher water quality standards in the Lake. The hydraulic model studies will develop criteria for future projects of this type and will provide information necessary for the Water Quality Prediction Study being conducted under EPA grant No. 16080 ERQ.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 ERQ

TITLE OF PROJECT: "Correlated Studies of Vancouver Lake--Water Quality Prediction Study"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Washington State University Pullman, Washington 99163	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Pullman, Washington

DESCRIPTION OF PROJECT

Award Date: September 16, 1969	Project Cost: $27,651
Completion Date: March 15, 1971	Federal Cost: $25,614

Summary:

The objective of the project is to gather such information and establish such techniques as would provide the basis of prediction of water quality in a shallow lake such as Vancouver Lake in Vancouver, Washington, resulting from different management practices and altered flow regimes. This involves the determination of seasonal variations in water quality in the Columbia River and in Vancouver Lake. These data and data provided by hydraulic model studies will be used to predict water quality in the Lake if the southern part of the Lake is connected with the Columbia River by a new channel. The hydraulic model data will be provided from grant project 16080 ERP.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 EVT

TITLE OF PROJECT: "Lake Diking as a Water Pollution Management Tool"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Brigham Young University Provo, Utah 84601	Mr. Lowell E. Leach Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Provo, Utah

DESCRIPTION OF PROJECT

Award Date: June 3, 1971 Project Cost: $50,635

Completion Date: June 30, 1972 Federal Cost: $48,100

Summary:

The objectives of the project are to investigate the use of dikes to control water quality in natural or man-made lakes; to determine the effectiveness of the dike system in the management of lake water quality; to recommend location and management details which will provide optimum control of water quality; and to develop criteria and methodology for general application of diking to control water quality in natural or man-made lakes. Work of this project is being conducted at Utah Lake located at Provo, Utah. During the first year of this study, sampling stations were established within the Lake and its tributaries, and sampling for water quality was conducted. Gaging stations or tributaries and discharges from the Lake were also established, where needed, and hydrological data were developed. The second year's work will further develop water quality characteristics by continuing the sampling program and will concentrate on the computerized evaluation of available data.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Demonstration) Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 FBH

TITLE OF PROJECT: Tertiary Treatment with a Controlled Ecological System

GRANTEE OR CONTRACTOR:

Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, California 91302

EPA PROJECT OFFICER:

Mr. Kenneth E. Biesinger
National Water Quality Laboratory
6201 Congdon Boulevard
Duluth, Minnesota 55804

Project Site: Calabasas, California

DESCRIPTION OF PROJECT

Award Date: April 27, 1970
Project Cost: $53,930

Completion Date: April 30, 1972
Federal Cost: $44,800

. Summary:

This project will conduct controlled experiments in a series of ponds. Algae to be grown in first pond, crustacea and fish in following ones. Control will consist of observing effect of feed rates through each pond on populations and water quality parameters. In continuation, an ecological system will be designed and operated as part of reclamation process. Objectives are:

1. Obtain an economical method of producing recreational grade water from secondary sewage effluent.
2. Acquire data on operation of ecological systems in order to establish design criteria.
3. Determine potential of controlled ecological systems for reducing concentrations of nitrogen and phosphorus.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 FQK

TITLE OF PROJECT: "The Role of Trace Elements in the Management of Nuisance Growths"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Academy of Natural Sciences of Philadelphia	Dr. William R. Duffer
	Robert S. Kerr Water Research Center
19th and the Parkway	P. O. Box 1198
Philadelphia, Pennsylvania 19103	Ada, Oklahoma 74820

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: April 1, 1971 Project Cost: $92,218

Completion Date: March 31, 1972 Federal Cost: $85,694

Summary:

The objective of this project is to determine if more favorable conditions for species of algae which are a desirable food source in the aquatic ecosystem can be provided by manipulation of trace nutrients. Laboratory experiments, during this second year of the project, will be conducted to determine the effect of various concentrations of nickel, vanadium, chromium, and selenium on the development of various kinds of algae under nutrient enriched conditions. A practical application phase will be initiated for actual regulation of populations of nuisance algae. Experimentation in the application phase will determine the value of manganese additions in regulating algal populations in streams and ponds.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 FQV

TITLE OF PROJECT: "Water Quality Control Through Single Crop Agriculture"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Bemidji State College Bemidji, Minnesota 55601	Mr. Richard E. Thomas Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Bemidji, Minnesota

DESCRIPTION OF PROJECT

Award Date: November 17, 1970	Project Cost: $11,299
Completion Date: June 30, 1971	Federal Cost: $10,734

Summary:

The rapid growth of the wild rice industry and the intimate association of the industry with the aquatic environment poses a potential threat to recreational waters. The purpose of this project is to study the impact of wild rice culture on water quality. The overall objective is to provide information that will make possible the development of the industry in such a manner as to minimize harmful ecological effects.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 FSN

TITLE OF PROJECT: "The Development of an Engineering Methodology for the Reaeration of Rivers, Ponds and Lakes"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
JBF Scientific Corporation Lakeside Office Park Burlington, Massachusetts 01880	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Burlington, Massachusetts

DESCRIPTION OF PROJECT

Award Date: October 8, 1970	Project Cost: $39,284
Completion Date: August 31, 1971	Federal Cost: $37,320

Summary:

The objective of this project is to develop an engineering design method for applying existing aeration technology to the reaeration of rivers and lakes. More specifically, it is to develop methods of transforming the available data that are taken on aeration devices and in streams into design formats (charts, formulas and tables) so that data can be used to credit the increase in DO in specific waters over given periods of time. The project emphasizes the development of the engineering design methods that can be used in actual practice and the presentation of the methods so that practical applications can be made to a specific river or lake by personnel with background in the biological sciences as well as the engineering sciences.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 FVK

TITLE OF PROJECT: "Hypolimnetic Flow Regimes in Lakes and Impoundments"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Towne School of Civil & Mechanical Engineering University of Pennsylvania Philadelphia, Pennsylvania 19104	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Philadelphia, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: September 15, 1970	Project Cost: $80,274
Completion Date: June 30, 1971	Federal Cost: $75,274

Summary:

This project is a combined laboratory and analytic investigation of hypolimnetic flows in impoundments. It is directed toward development of impoundment water quality management techniques through understanding of the applied hydraulics of such flows. This project will demonstrate the existence of many hydraulically different hypolimnetic flows, will develop methods of classification of these flows based on reservoir geometry and operation and will determine relationships among the quantitative parameters entering their description.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT*, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 FWE (14-12-875 Mod.)

TITLE OF PROJECT: "Development of Phosphate-Free Heavy Duty Detergents"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
The Gillette Company Research Institute 1413 Research Boulevard Rockville, Maryland 20850	Dr. A. F. Forziati Processes and Effects Division Environmental Protection Agency Washington, D. C. 20460

Project Site: Rockville, Maryland

DESCRIPTION OF PROJECT

Award Date:	May 22, 1970	Project Cost:	$372,274
Completion Date:	November 21, 1971	Federal Cost:	$372,274

Summary:

This project will demonstrate the development of heavy duty home laundry detergents that contain no phosphates, are highly biodegradable, non-toxic to aquatic organisms under both chronic and acute tests, have significantly reduced biostimulatory properties compared to phosphate, and can satisfy the demands placed on a detergent by consumers. This is a four phase study of which phases I, II, III involving synthesis and testing of the candidate detergents. A future project, phase IV, which may be considered later on, involves testing the formulations in a market evaluation study. It is anticipated that this contract effort will aid in the control of eutrophication by reducing the phosphate entering the aquatic environment from one of the major pollutant sources--home laundry detergents. Contract modified to include the testing of commercially available phosphate-free detergents. Contract modified to include purchase of necessary equipment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 FYA

TITLE OF PROJECT: "Oxygen Regeneration of Polluted Rivers"

GRANTEE OR CONTRACTOR:

Rutgers - The State University
New Brunswick, New Jersey 08903

EPA PROJECT OFFICER:

Dr. Curtis C. Harlin, Jr.
Robert S. Kerr Water Research Center
P. O. Box 1198
Ada, Oklahoma 74820

Project Site: New Brunswick, New Jersey

DESCRIPTION OF PROJECT

Award Date: May 1, 1970

Completion Date: April 30, 1971

Project Cost: $41,205

Federal Cost: $29,000

Summary:

This project continues work conducted during the preceding three years under Grant No. 16080 DUP. The objective is to provide answers to questions raised during the previous studies--specifically: (1) the condition of unusually high deoxygenation rates which occurred downstream of aerators; (2) the effectiveness of flow concentration devices used in conjunction with surface aerators; and (3) the comparison of mechanical aerators with pure oxygen diffusers. The test site for the project was located on the Passaic River near Pine Brook, New Jersey.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 15040 FYW (16080 FYW)

TITLE OF PROJECT: "Hypolimnion Aeration with Commercial Oxygen"

GRANTEE OR CONTRACTOR:

The University of Texas at Austin
Austin, Texas 78712

EPA PROJECT OFFICER:

Mr. Lowell E. Leach
Robert S. Kerr Water Research Center
P. O. Box 1198
Ada, Oklahoma 74820

Project Site: Austin, Texas

DESCRIPTION OF PROJECT

Award Date:	April 1, 1971	Project Cost:	$49,880
Completion Date:	March 31, 1972	Federal Cost:	$46,080

Summary:

Water quality control in impoundments has conventionally been controlled through destratification. Destratification has definite adverse effects, principally increasing algal productivity and destroying the beneficial cold water resource of the hypolimnion. The objective of this study is to investigate water quality control within the hypolimnion through injection of commercial oxygen while maintaining stratified conditions. Commercial oxygen is economically attractive and complete absorption within the hypolimnion is possible when small oxygen bubbles are injected at sufficient depths. The specific objectives are as follows: (1) Experimentally determine the effect of bubble size and injection depth on oxygen absorption characteristics; (2) Evaluate the flow pattern and spatial distribution of dissolved oxygen in the vicinity of a single oxygen disperser at various oxygen injection rates; (3) Develop computer simulation of hypolimnion aeration using experimentally derived parameters.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 GNC (68-01-0102)

TITLE OF PROJECT: "Catalog of Manufactured Products Having Water Pollution Potential"

GRANTEE OR CONTRACTOR:

Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts 02140

Project Site: Cambridge, Mass.

EPA PROJECT OFFICER:

Mr. Charles E. Myers
Municipal Technology Branch
Technology Division
Environmental Protection Agency
Washington, D. C. 20460

DESCRIPTION OF PROJECT

Award Date: June 1, 1971	Project Cost: $66,285
Completion Date: June 25, 1971	Federal Cost: $66,285

Summary:

The objective of this project is the preparation of a catalog of manufactured products having water pollution potential. A proliferation of manufactured products are, during the course of their normal use, ultimately discharged to the environment, where they have the potential of creating serious pollutional problems. Manufactured products are defined as those finished commodities purchased for use directly by consumers. The catalog of products having water pollution potential will be prepared and products will be grouped in conformance with the Standard Industrial Classification.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 GPF (14-12-943)

TITLE OF PROJECT: "The Corrosion Potential of Nitrilotriacetic Acid (NTA)"

GRANTEE OR CONTRACTOR:
Battelle Memorial Institute
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

Project Site: Columbus, Ohio

EPA PROJECT OFFICER:
Mr. Charles E. Myers
Municipal Technology Branch
Technology Division
Environmental Protection Agency
Washington, D. C. 20460

DESCRIPTION OF PROJECT

Award Date: September 16, 1970 Project Cost: $49,800

Completion Date: November 30, 1970 Federal Cost: $49,800

Summary:

The objective of this project is to determine the corrosivity of NTA and NTA-containing detergent formulations on the metallic materials of construction commonly employed in consumer products, plumbing equipment, and wastewater collection and treatment systems.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 GVW (New #801042)

TITLE OF PROJECT: "Use of Emergent Vegetation for the Biological Treatment of Municipal Wastewater"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
East Central Wisconsin Regional Planning Commission	Dr. William R. Duffer
830 West Foster Street	Robert S. Kerr Water Research Center
Appleton, Wisconsin 54911	P. O. Box 1198
	Ada, Oklahoma 74820

Project Site: Appleton, Wisconsin

DESCRIPTION OF PROJECT

Award Date: May 1, 1972 — Project Cost: $82,101

Completion Date: April 30, 1973 — Federal Cost: $75,461

Summary:

Current research attempting to arrive at economically feasible and effective treatment of wastewater from small municipalities has focused on improvement of the activated sludge process, stabilization ponds and other such traditional methods. Research has shown that utilization of marsh vegetation, which can readily be harvested, is a possible answer to the secondary and tertiary treatment problems. The absorptive removal of nitrogen and phosphorus and also resistant organics, such as high molecular weight phenolics has been claimed as a principal advantage of passage of effluents through beds of growing emergent water plants. If this treatment were found to be economically feasible and effective in northern climates, it may have widespread application as a pollution abatement method. This grant proposal is designed to demonstrate the applicability of the "marsh" treatment to control and/or prevent water pollution caused by wastewater discharged from small municipalities.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 GWF

TITLE OF PROJECT: "Design and Operation Manual" Soil Systems for Treated Municipal Wastewaters"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
East Central State College Ada, Oklahoma 74820	Mr. Richard E. Thomas Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Ada, Oklahoma

DESCRIPTION OF PROJECT

Award Date:	January 18, 1971	Project Cost:	$27,428
Completion Date:	June 30, 1971	Federal Cost:	$24,343

Summary:

The primary objective of this project is to develop a manual for use in the design and operation of soil systems which are utilized for recycling treated municipal waste effluents. This project is to be a joint effort combining the expertise of the Robert S. Kerr Water Research Center, selected nationally recognized authorities, and East Central State College.

Secondary objectives which will be realized during the project are:

(1) The compilation of an annotated bibliography on the present state of the art in the subject field.

(2) A summary of needed research.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 GWU (68-01-0060)

TITLE OF PROJECT: "Establishing the Feasibility of Physically Removing, or Sealing in Place, Mercury-Laden Sediments"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
JBF Scientific Corporation Lakeside Office Park Burlington, Massachusetts 01880	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Burlington, Massachusetts

DESCRIPTION OF PROJECT

Award Date: March 31, 1971	**Project Cost:** $166,560
Completion Date: February 28, 1972	**Federal Cost:** $166,244

Summary:

Phase I of this project consists of laboratory studies of different methods of controlling or preventing cycling of mercury from mercury-laden bottom deposits. Various bonding agents will be investigated for the purpose of bonding mercury in sediment or making it insoluble. The effectiveness of removing mercury deposits by dredging will also be investigated.

Phase II consists of selecting a site for field evaluating control techniques developed during Phase I. Sites representing various environmental conditions will be surveyed and one or more sites selected for testing purposes. A detail survey of the selected site or sites will be made as the basis for evaluating the effectiveness of the test method.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16080 HFT (New #801028)

TITLE OF PROJECT: "Soil Treatment of Concentrated Organic Wastewaters"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Texas at El Paso El Paso, Texas 79999	Mr. Richard E. Thomas Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: El Paso, Texas

DESCRIPTION OF PROJECT

Award Date: March 1, 1972

Project Cost: $220,924

Completion Date: March 31, 1975

Federal Cost: $111,058

Summary:

The project will demonstrate the reclamation of a concentrated organic wastewater. In order to design the optimum soil treatment system for the particular waste and soil conditions involved in the proposed investigation, the project will be divided into two phases. In Phase I, preliminary investigation studies will be conducted for determining the soil and ground water characteristics, iptimum spraying and drying periods, and effects of various soil covers, and the effectiveness of wastewater pretreatments. Phase II will involve construction and operation of the full-scale system based on the studies conducted in Phase I. A portion of the reclaimed water will be recycled through the plant for reuse.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 HTD (68-01-0086)

TITLE OF PROJECT: "The Control of Pollution from Mercury-Laden Bottom Deposits in Streams and Lakes"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Advanced Technology Center, Inc. Post Office Box 6144 Dallas, Texas 75222	Dr. William R. Duffer Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Dallas, Texas

DESCRIPTION OF PROJECT

Award Date:	June 25, 1971	**Project Cost:**	$42,930
Completion Date:	January 24, 1972	**Federal Cost:**	$42,930

Summary:

The objective of the project is to develop new and effective methods for controlling pollution from mercury-laden bottom deposits in streams and lakes. Under anaerobic conditions found in some bottom sediments, dissolved mercury exhibits a tendency to precipitate as the highly insoluble mercuric sulfide. This appears to be a significant natural scavenging process which occurs without destroying the ecological balance of the aquatic organisms in the contaminated area of concern. Experiments are designed to expand and enhance the natural scavenging process by artificially supplementing the reaction through use of sulfur-based mercury "getter" systems coated onto recoverable substrates. Interrelationships of redox conditions, pH, and organic content of the sediments will be investigated with regard to volume, and chemical nature of the pollutants.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 16080 HTY (68-01-0087)

TITLE OF PROJECT: "Control of Pollution from Mercury-Laden Bottom Deposits in Streams and Lakes"

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Midwest Research Institute 425 Volker Boulevard Kansas City, Missouri 64110	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site: Kansas City, Missouri

DESCRIPTION OF PROJECT

Award Date: June 25, 1971 **Project Cost:** $58,871

Completion Date: January 24, 1972 **Federal Cost:** $58,871

Summary:

Three different approaches for controlling pollution from mercury-laden bottom deposits of streams and lakes will be evaluated in the laboratory as follows:

1. Dredging and beneficiation--Various beneficiation procedures including flotation and chemical process will be evaluated. If the mercury can be successfully removed from the sediments, sediment disposal problems will be reduced.

2. Chemical-physical sealing in place--These studies will consist of using scrap iron turnings to reduce the rate of transport of mercury from sediments to the overlying water. An overburden of clay or other material will be placed over the iron to further reduce mercury transport, act as a binder to hold the iron in place, and reduce the oxidation rate of the iron.

3. Enzyme inhibitors--This study will be directed to the interruption of the methylation process thus preventing the formation of the highly toxic and water soluble methyl mercury.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 16080 HTZ (68-01-0088)

TITLE OF PROJECT: "The Development of a Material-Equipment System to Overlay Mercury and Benthic Nutrient Contaminated Sludge Deposits with a Polymer Film"

GRANTEE OR CONTRACTOR:

Battelle Memorial Institute
Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

EPA PROJECT OFFICER:

Dr. William R. Duffer
Robert S. Kerr Water Research Center
P. O. Box 1198
Ada, Oklahoma 74820

Project Site: Columbus, Ohio

DESCRIPTION OF PROJECT

Award Date: June 25, 1971
Project Cost: $67,586

Completion Date: February 24, 1972
Federal Cost: $67,586

Summary:

The object of the project is to develop new and effective methods for controlling pollution from mercury-laden bottom deposits in streams and lakes. The approach of this research is to develop a barrier film which can be formed in situ to cover contaminated bottom sediments. Polymer film blankets will be developed and tested to determine their effectiveness for sealing-in mercury contaminants contained in bottom sediments. The continued generation of dimethyl mercury under anaerobic conditions established by the polymer film is of concern. Consequently, efforts will be directed toward developing a material which forms an impermeable membrane to solubles present beneath it and which has efficient scavenging properties.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 CONTRACT, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16080 HUA (Contract No. 68-01-0089)

TITLE OF PROJECT: "Control of Pollution from Mercury-Laden Bottom Deposits in Streams and Lakes"

GRANTEE OR CONTRACTOR:
Martin Marietta Corporation
Research Institute for Advanced Studies
1450 S. Rolling Road
Baltimore, Maryland 21227
Project Site:

EPA PROJECT OFFICER:
Dr. Curtis C. Harlin, Jr.
Robert S. Kerr Water Research Center
P. O. Box 1198
Ada, Oklahoma 74820

DESCRIPTION OF PROJECT

Award Date: June 25, 1971

Completion Date: January 24, 1972

Project Cost: $33,645

Federal Cost: $33,645

Summary:

The objective of this project is to establish the desirability of reducing or preventing mercury cycling from sediments by using porous coverings. Laboratory tests will be conducted to evaluate the effectiveness of applying sand, gravel, and/or "popcorn" concrete as the porous cover material. Mercury-enriched sediments will be examined to determine the effect on the migration of mercury into the water by varying cover material depths, concentration or organic matter, and reducing conditions.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 CONTRACT, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 16080 HUB (Contract No. 68-01-0090)

TITLE OF PROJECT: "Control of Pollution from Mercury-Laden Bottom Deposits in Streams and Lakes"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Arthur D. Little, Inc. 15 Acorn Park Cambridge, Massachusetts 02140	Dr. Curtis C. Harlin, Jr. Robert S. Kerr Water Research Center P. O. Box 1198 Ada, Oklahoma 74820

Project Site:

DESCRIPTION OF PROJECT

Award Date: June 25, 1971	Project Cost: $30,857
Completion Date: January 24, 1972	Federal Cost: $30,857

Summary:

The objective of this project is to investigate the use of proteinaceous materials to adsorb or bind mercury to prevent its escape from bottom sediments. Laboratory feasibility studies will be conducted to ascertain if proteinaceous substances are capable of binding practical amounts of mercury and to elaborate on parameters which might affect this adsorption at the trace concentrations normally found in the environment.

COLD CLIMATE RESEARCH

5-A

COLD CLIMATE RESEARCH

The objectives of EPA for Arctic water quality research are to provide the basis for establishing equitable and effective water quality criteria requirements, and to provide the tools (waste treatment and control technology) to meet these requirements. The program is carried out under Sections 6a(2) and 5 of the Federal Water Pollution Control Act. Specific, separate authorizations for the demonstration of environmental systems for Native Alaska Villages is contained in Section 20 of the FWPC Act.

Federal involvement in Arctic water pollution control research must provide the supporting facts to aid development of equitable and appropriate water quality criteria that protect the aquatic environment while allowing economic development to take place. Arctic aquatic systems are abnormally stressed under natural conditions because of the Arctic environment. It is essential to obtain a clear understanding of the added stress caused by man's waste materials and activities. Water quality criteria must be responsive to the needs of particular aquatic systems. This requires substantial supporting facts which will allow reasonable levels of protection to be established.

The high cost of constructing and operating treatment facilities in the Arctic makes it necessary to develop new approaches to waste handling, treatment and final disposal. Thought needs to be given to such radical innovations as the development of non-water carriage sewage collection systems. Systems must be developed that require a minimum of protection from the harsh climate.

The program is divided into two areas: waste treatment and control technology and water quality studies. The waste treatment and control technology area includes the development and demonstration of cold climate treatment processes, oil spill cleanup technology and pollution control through land management. The water quality criteria area includes investigations of the cold climate ecosystem and studies of the fate and effect of pollutants.

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PPB 16100 - Cold Climate Research

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*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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Final Reports Available

PPB 16100 - Cold Climate Research

Report Number	Title/Author	Source
16100---06/70	Biological Waste Treatment in the Far North; by FWQA, Alaska Water Lab., College, Alaska	NTIS - PB 195 673
16100---10/70	The Chena River - A Study of a Subarctic Stream; by Alaska Water Lab., FWQA, College, Alaska	NTIS - PB 197 857
16100EXH11/71	International Symposium on Water Pollution Control in Cold Climates; by Univ. of Alaska, College, Alaska	GPO - $2.50 5501-0208
16100GOI09/71	Environmental Guidelines for Road Construction in Alaska; by Frederick B. Lotspeich, Alaska Water Lab., EPA, College, Alaska	NTIS - PB 206 155

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INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16100 EOM

TITLE OF PROJECT: "Baseline Water Quality Study of the Alaskan Arctic Estuarine Development"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Institute of Marine Sciences University of Alaska College, Alaska 99701	Mr. Eldor W. Schallock Alaska Water Laboratory College, Alaska 99701

Project Site: College, Alaska

DESCRIPTION OF PROJECT

Award Date:	May 1, 1971	Project Cost:	$74,833
Completion Date:	April 30, 1972	Federal Cost:	$71,091

Summary:

This project involves detailed work in the Colville River estuarine area and comparative work all along the Alaskan arctic coast with special interest given to areas where pollution problems may occur. The detailed work involves the physical circulation and flushing in the shallow arctic estuaries, the nature and movements of sediments, the ice movements in the estuaries and rivers with interest in the effect of ice on the transport of pollutants, the chemistry and biology of primary productivity, and a general survey emphasizing the marine aquatic environments of the Alaskan Arctic.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16100 EHX

TITLE OF PROJECT: "International Symposium on Water Pollution Control in Cold Climates"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Alaska College, Alaska 99701	Mr. Richard Latimer Alaska Water Laboratory College, Alaska 99701

Project Site: College, Alaska

DESCRIPTION OF PROJECT

Award Date: January 1, 1970	Project Cost: $48,401
Completion Date: November 1971	Federal Cost: $26,192

Summary:

An international symposium on cold climate water pollution research was held at the University of Alaska July 22-24, 1970, to bring together representatives of most of the circumpolar nations. Papers were presented on the engineering and scientific bases for waste treatment and receiving stream criteria. Symposium proceedings have been published as EPA report 16100 EXH 11/71.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 16100 FWQ

TITLE OF PROJECT: "Investigations on Possible Effects of Crude Oil on Aquatic Organisms"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Alaska College, Alaska 99701	Mr. Ronald C. Gordon Alaska Water Laboratory College, Alaska 99701

Project Site: College, Alaska

DESCRIPTION OF PROJECT

Award Date:	June 1, 1970	Project Cost:	$87,529
Completion Date:	November 30, 1971	Federal Cost:	$82,916

Summary:

The objective of this project is to investigate the physical and physiological effects of various doses of oil pollution on the sockeye salmon. Three series of experiments are planned, in salt water, all replicated at three temperatures to approximate the maximum, minimum, and mean temperatures in the Central Alaskan fisheries areas.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 16100 PAK

TITLE OF PROJECT: "Lime Disinfection of Sewage Bacteria at Low Temperature"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Department of Microbiology Colorado State University Fort Collins, Colorado 80521	Mr. Ronald C. Gordon Alaska Water Laboratory College, Alaska 99701

Project Site: Fort Collins, Colorado

DESCRIPTION OF PROJECT

Award Date: May 1, 1971

Project Cost: $23,195

Completion Date: November 30, 1972

Federal Cost: $22,035

Summary:

This laboratory study will be done with raw sewage from a municipal plant and basic studies will be at 5°C with comparison tests at 1° and 10°C and possibly at 15°C. Indices of pathogens will be used to determine survival or death - coliforms and fecal coliforms. Exposure time and pH effect on the bacteria will be determined at each temperature. Relative effectiveness of disinfection of the bacteria in the liquid as well as the flocculated phases of sewage will be determined. If adequately high pH levels cannot be reached effectively with lime, the possible use of commercial grade caustics will be investigated. Some preliminary cost - effectiveness determinations should result. The effect of this lime treatment on phosphate removal will also be observed. As part of this project, experiments will be conducted on the effectiveness of lime treatment on secondary effluents.

DISSOLVED NUTURIENT REMOVAL

6.A

DISSOLVED NUTRIENT REMOVAL

Over the past several years, this sub-program element has produced significant results in developing new treatment processes such as the addition of iron and aluminum for phosphorus removal, and stage nitrification and biological denitrification for nitrogen removal. The technology has been implemented into full-scale municipal designs. Technology has been developed and implemented in physical-chemical means for removing ammonia-nitrogen in the form of stripping at Lake Tahoe, ion-exchange and breakpoint chlorination.

Nearly 6.0 million dollars have been expended in this area in recent years with approximately 50% of the total allocated to phosphorus removal. The major accomplishments can be measured in terms of improved treatment capability, quality and economy.

Significant gains in the area of nutrient removal have been made, and the ensuing years should see an improvement in the capability of chemical dosing control technology to minimize costs and solids handling. Attention must be directed to solving the treatment problems associated with control of nitrogen. The ensuing years will see a significant upsurge of interest in nitrogen control. Therefore, innovative techniques must be developed to meet the thrust of that interest, and to provide the answers needed for implementation of technology required for satisfying the water quality standards of the '70's and 80's.

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*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

FINAL REPORTS AVAILABLE

PPB 17010 - Dissolved Nutrient Removal

Report Number	Title/Author	Source
17010---10/68	Dilute Solution Reactions of the Nitrate Ion as Applied to Water Reclamation; by Rocketdyne, Div. of North American Rockwell Corp.	NTIS-PB 190 195
17010---01/70	Treatment Techniques for Removing Phosphorus from Municipal Wastewaters; by J. J. Convery, AWTRL Lab., FWQA, Cincinnati, Ohio	GPO - $ .50
17010---02/70	An Electrochemical Method for Removal of Phosphates from Wastewater; by Dynatech Corp., Cambridge, Mass.	GPO - $ .50
17010DBL12/70	Colloid Flotation and Adsorbing Colloid Flotation; by Northeastern Univ., Boston, Massachusetts	NTIS-PB 205 001
17010DDO11/71	Mechanisms of Biological Luxury Phosphate Uptake; by Dept. of Microbiology and Medical Technology, Univ. of Arizona, Tucson, Arizona	GPO - $1.00
17010DFV09/70	Phosphate Study at the Baltimore Back River Wastewater Treeatment Plant; by City of Baltimore, Maryland	GPO - $1.50
17010DHK08/69	Chemical Exfoliated Vermicolite for Removal of Phosphate from Wastewaters; by Jacob Block, W. R. Grace & Co., Clarksville, MD	GPO - $ .50
17010DHT09/70	Methanol Requirement and Temperature Effects in Wastewater Denitrification; by Gulf South Research Institute, New Iberia, LA	GPO - $ .50
17010DJA11/70	Investigation of a New Phosphate Removal Process; by Envirogenics Co., El Monte, Cal.	GPO - $ .75
17010DXD08/70	Phosphorus Removal by an Activated Sludge Plant; by Sewerage Commission of the City of Milwaukee, Wisconsin	GPO - $1.00

Report Number	Title/Author	Source
17010EKI04/70	Kinetics and Mechanism of Precipitation and Nature of the Precipitate Obtained in Phosphate Removal from Wastewater Using Aluminum (III) and Iron (III) Salts; by Atomics International, Div. of North American Rockwell Corp., Canoga Park, Cal.	GPO $ .75
17010ELQ08/71	Advanced Wastewater Treatment as Practiced at South Tahoe; by South Tahoe Public Utility District, South Lake Tahoe, Cal.	GPO - $3.25
17010EVB11/70	Process Alternatives for Removal of Carbonaceous, Nitrogenous, and Phosphorus Materials from Concentrated Waste Streams; by Engineering-Science, Inc., Oakland, Cal.	GPO - $ .35
17010FAH07/70	Development of Phosphate Removal Processes; by Detroit Metro. Water Dept., Detroit, MI	GPO - $ .65
17010FJY02/69	Alumina Columns for Selective Removal of Phosphorus from Wastewater; by Pacific Northwest Lab., Battelle Memorial Insti., Richland, Washington	NTIS-PB 189 405
17010FKA05/70	Development of a Pilot Plant to Demonstrate Removal of Carbonaceous, Nitrogenous & Phosphorus Materials from Anaerobic Digester Supernatant & Related Process Streams; by FMC Corp., Santa Clara, Cal.	GPO - $1.00
17010FKF12/69	Basic Salinogen Ion-Exchange Resin for Selected Nitrate Removal from Potable & Effluent Waters; by Tyco Labs, Waltham, Mass.	GPO - $1.00
17010FMX01/71	Nitrification and Denitrification of Waste waters; by Univ. of Minnesota, Minneapolis, MN	NTIS-PB 202 350
17010GNP	Development of a Design Manual for Advanced Waste Treatment Processes, Phosphorus Removal; by Black & Veatch C.E., Kansas City, MO	Technology Transfer

Report Number	Title/Author	Source
17010DYB02/71	Phosphorus Removal and Disposal from Municipal Wastewater; by Univ. of Texas Medical Branch, Galveston, Texas	GPO - $1.25
17010EAP10/70	Feasibility of Liquid Ion Exchange for Extracting Phosphate from Wastewater; by General Mills Chemicals Inc., Minneapolis, Minn.	GPO - $ .50
17010ECZ03/69	Ammonia Removal from Agricultural Runoff and Secondary Effluents by Selected Ion Exchange; by Battelle Memorial Insti., Richland, WA	NTIS-PB 187 759
17010ECZ02/71 and 17010EEZ	Wastewater Ammonia Removal by Ion Exchange; by Battelle Northwest, Richland, Wash. and South Tahoe Public Utility District, South Lake Tahoe, California	GPO - $1.25
17010EGR01/71	Nitrate Removal from Wastewater by Ion Exchange; by Dow Chemical Co., Walnut Creek, Cal.	GPO - $1.00
17010ED006/70	Phosphorus Removal Using Chemical Coagulation and a Continuous Countercurrent Filtration Process; by Johns-Manville Products Corp., Manville, NJ	GPO - $ .65
17010EED07/70	The Electro-Oxidation of Ammonia in Sewage to Nitrogen; by Ionics, Inc., Watertown, Mass.	GPO - $ .55
17010EER06/70	Mobile Pilot Plant for Removal of Phosphate from Wastewaters by Adsorption on Alumina; by Battelle Institute, Richland, Wash.	NTIS
17010EEX10/70	Development of a Chemical Denitrification Process; by Rocketdyne Research, North American Rockwell, Canoga Park, Cal.	GPO $ .55
17010EFX04/70	Phosphate Removal from Wastewaters Using Lanthanum Precipitation; by Atomics International, Div. of North American Rockwell Corp., Canoga Park, Cal.	GPO - $ .55
17010EIP05/71	Soluble Phosphorus Removal in the Activated Sludge Process, Part II: Sludge Digestion Study; by The Soap and Detergent Asso., New York, NY	GPO $ .65

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DBL

TITLE OF PROJECT: Colloid Flotation and Adsorbing Colloid Flotation

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Northeastern University Boston, Massachusetts 02115	C. A. Brunner National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Boston, Massachusetts

DESCRIPTION OF PROJECT

Award Date: December 11, 1968	**Project Cost:** $43,878
Completion Date: February 28, 1970	**Federal Cost:** $41,684

Summary:

The proposed research investigated the applicability of colloid flotation and adsorbing colloid flotation to the removal of pollutants from wastewaters. Specifically it explored the influence of a variety of parameters on the removal of kaloinite and montmorillonite clays and ferric oxide sols. These parameters include surfactant structure, pH, and interferring ions. In each they related the electrophoretic mobility of the colloidal particulate to the extent of flotation.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17010 DDQ

TITLE OF PROJECT: Mechanisms of Biological Luxury Phosphate Uptake

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
The University of Arizona	Robert L. Bunch
Tucson, Arizona 85721	National Environmental Research Center, AWTRL
	Cincinnati, Ohio 45268

Project Site: Tucson, Arizona

DESCRIPTION OF PROJECT

Award Date: June 18, 1969	**Project Cost:** $88,878
Completion Date: June 30, 1971	**Federal Cost:** $82,396

Summary:

The objectives of the project are to study the factors and mechanisms involved in the luxury uptake and retention of phosphorus by activated sludge and its bacterial population.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 DFV

TITLE OF PROJECT: Phosphate Study at the Back River Waste Water Treatment Plant, Baltimore, Maryland

GRANTEE OR CONTRACTOR:
City of Baltimore
Baltimore, Maryland

EPA PROJECT OFFICER:
E. F. Barth
National Environmental Research Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Baltimore, Maryland

DESCRIPTION OF PROJECT

Award Date: December 24, 1969 **Project Cost:** $221,940

Completion Date: February 1, 1970 **Federal Cost:** $221,940

Summary:

The objective of this project was to isolate the controlling relationships which effect the efficiency of phosphorus removal in an activated sludge plant. The existing 20 MGD activated sludge plant was, by simple modification, split into two paralled waste systems. One stream was maintained as a control while the other stream was an experimental unit in which operational parameters were varied. The effect on the phosphorus removal in the experimental segment was compared to that of the controlled segment of the plant.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 DHK (14-12-485)

TITLE OF PROJECT: Chemically Exfoliated Vermiculites for Removal of Phosphate from Waste Waters

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
W. R. Grace & Co. Washington Research Center Clarksville, Maryland 21029	Mr. Dobbs National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site. Clarksville, Maryland

DESCRIPTION OF PROJECT

Award Date: January 17, 1969	**Project Cost:** $48,076
Completion Date: February 1970	**Federal Cost:** $48,076

Summary:

The objective of this contract was to determine the practibility of using chemically modified and regenerable vermiculites for the removal of phosphate from wastewater.

The treatment method proposed was an ion exchange process which made use of relatively inexpensive vermiculite and which should have been highly selective for phosphate. The contractor treated the vermiculite to increase its phosphate-sorbing capacity and determined the maximum phosphate removal and cost for the chemical treatment. The study also included a determination of the feasibility of regenerating the phosphate-loaded vermuclite so it may be reused to treat more wastewater.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17010 DHT (14-12-527)

TITLE OF PROJECT: Study of Methanol Requirement and Temperature Effects In Sewage Denitrification

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Gulf South Research Institute	Ed Barth
800 GSRI Avenue	National Environmental Research Center, AWTRL
Baton Rouge, La. 70808	Cincinnati, Ohio 45268

Project Site: Baton Rouge, La.

DESCRIPTION OF PROJECT

Award Date: May 22, 1969	**Project Cost:** \$57,704
Completion Date: September 1970	**Federal Cost:** \$57,704

Summary:

Objective is to determine under closely controlled conditions the minimum ratio of methyl alcohol to nitrate-nitrogen for efficient biological denitrification and to determine the effect of temperature on both this ratio and the rate of denitrification. The experimental system included both suspended growth and packed column reactors.

The most efficient CH_3OH; NO_3-N ratio is between 2:1 and 3:1, but it varies slightly with temperature. Dissolved Oxygen was not a major factor governing the efficiency of either of the two denitrifying units employed, but effective denitrification at lower temperatures and high dissolved Oxygen content required ratios equal to or slightly greater than 3:1.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1701 DIX

TITLE OF PROJECT: Controlled Removal of Phosphates Using Chemical and Biological Techniques in Secondary Treatment

GRANTEE OR CONTRACTOR:
Department of Waste Water Treatment
City of Traverse City
City Hall
Traverse City, Michigan

EPA PROJECT OFFICER:
Dr. R. Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site:

DESCRIPTION OF PROJECT

Award Date: July 29, 1968

Project Cost: $101,150

Completion Date: October 31, 1970

Federal Cost: $ 75,863

Summary:

The project objective is to demonstrate the removal of 80 percent of the phosphates from sewage by primary addition of ferrous iron and polymers. The project will employ the use of four pilot plants (bench scale) with the capacity of 2 gpm. Two will be activated sludge, one a control and two will be biofilters (trickling filters), again one being a control. Influents to the test units will be treated with various combinations of polymers and ferrous iron. Results of these units will be compared to the control units. Efficiencies, reliability, and economics will be optimized and will be used to formulate design criteria.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 DJA (14-12-487)

TITLE OF PROJECT: Laboratory Evaluation of New Phosphate Removal Process

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Aerojet-General Corporation (Envirogenics) 9200 East Flair Drive El Monte, California 91734	Richard A. Dobbs Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: El Monte, California

DESCRIPTION OF PROJECT

Award Date: February 7, 1969	**Project Cost:** $132,283
Completion Date: September 1970	**Federal Cost:** $132,283

Summary:

The objective of this contract extension is to establish the technical feasibility of phosphate removal from wastewater using resin-metal sorbents. Results obtained under the present contract indicate that an iron-treated cation exchange resin exhibited a potentially useful capacity for removing phosphate.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 DMR (WPO 173-02-68)

TITLE OF PROJECT: Phosphate Removal by Biological Process

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Trenton Engineering Department 2707 Riverside Drive Trenton, Michigan 48188	Mr. Harold C. Foust Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Trenton, Michigan

DESCRIPTION OF PROJECT

Award Date: February 1, 1968	**Project Cost:** $71,900
Completion Date: May 31, 1969	**Federal Cost:** $65,500

Summary:

To complete a pilot plant demonstration of the FMC process in which soluble phosphates are removed by natural biological processes from wastewater and contained in the sludge withdrawn from the treating units. Phosphates will be removed from the liquid from sludge dewatering either chemically or physically.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 DRD (14-12-498)

TITLE OF PROJECT: A Study of Nitrification-Denitrification

GRANTEE OR CONTRACTOR:
Aerojet-General Corporation
9200 East Flair Drive
El Monte, California 91734

EPA PROJECT OFFICER:
E. F. Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: El Monte, California

DESCRIPTION OF PROJECT

Award Date: February 25, 1969

Project Cost: $79,118

Completion Date: April 1970

Federal Cost: $79,118

Summary:

A program to incorporate biological denitrification into a wastewater treatment system was undertaken with the objective of developing a process that depends exclusively on the carbon compounds contained in the wastewater to supply metabolic energy to the microflora. In the experimental program the incoming nitrogenous material was oxidized to nitrate in an aerobic phase and reduced to nitrogen gas in an anaerobic phase. Conditions for developing anitrifying microflora were investigated using a primary wastewater effluent as feed. Flows into the system were varied to give a range of residence times. Anaerobic batch experiments were carried out to determine if stored reserves could support denitrification. Under appropriate conditions almost 100% of the nitrates could be reduced. The effluent from the aerobic unit served as the feed for the anaerobic process. At appropriate intervals this situation was reversed by switching the airflows and feed sources. Over 95% of the wastewater nitrogen in wastewater was removed. Nitrate-nitrogen removal rates ranged from 0.600 to 1.00 mg/hr/g MLVS. A mathematical model was developed which described the response to cycled aerobic-anaerobic operation. The alternating cycle approach was shown to be an effective method for removing nitrogen from wastewater.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 DRF (14-12-581)

TITLE OF PROJECT: Biological Removal of Phosphates from Waste Waters by Luxury Uptake in Activated Sludge Treatment Plants

GRANTEE OR CONTRACTOR:
900 West Orange Grove Road
Tucson, Arizona 85704

EPA PROJECT OFFICER:
William Cawley
Environmental Protection Agency
4th & M St., S. W.
Waterside Mall - Room 3206
Washington, D. C. 20460

Project Site: Tucson, Arizona

DESCRIPTION OF PROJECT

Award Date: June 27, 1969

Project Cost: $13,350

Completion Date: January 1971

Federal Cost: $13,350

. Summary:

To identify the key factors necessary for biological removal of phosphorus. This will be accomplished by extensive survey and study of plants where good phosphorus removal is obtained. It is hoped to obtain enough data to perform a statistical analysis and identify the important operating conditions that are conducive to good phosphorus removal in activated sludge treatment plants.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DSN

TITLE OF PROJECT: Full-scale Evaluation of the Use of Flow Equalization and of Chemical Additions to Primary Treatment to Improve the Performance of Trickling Filter Plants

GRANTEE OR CONTRACTOR:
City of Riverview
Riverview, Michigan

EPA PROJECT OFFICER:
Ed Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Riverview, Michigan

DESCRIPTION OF PROJECT

Award Date: April 1, 1969

Project Cost:

Completion Date: October 1, 1971

Federal Cost: $494,154 (Project Cancelled)

Summary:

To demonstrate and evaluate the feasibility, effectiveness, and economics of phosphorus removal from municipal waste water by means of a chemical precipitation method, developed by the Dow Chemical Company; to demonstrate and evaluate improvement and economics of overall wastewater treatment due to effects associated with chemical precipitation; to demonstrate and evaluate the effectiveness of the use of an equalization tank on the overall treatment of waste water; and to demonstrate and evaluate the effects of chemical precipitation in the primary phase of treatment on more effective secondary treatment, especially on biological treatment employing a modified trickling filter and secondary sedimentation.

GRANTEE CANCELLED PROJECT

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DTG

TITLE OF PROJECT: Removal of Organic and Eutrophying Pollutants by Combined Chemical and Biological Treatment

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
University of Notre Dame	**Robert Bunch**
Civil Engineering	Robert A. Taft Water Research Division
Notre Dame, Indiana 46556	Columbia Parkway Bldg.
	Environmental Protection Agency
	Cincinnati, Ohio 45268

Project Site: Notre Dame, Indiana

DESCRIPTION OF PROJECT

Award Date: February 1, 1968	**Project Cost:** $146,284
Completion Date: March 28, 1971	**Federal Cost:** $135,027

Summary:

To demonstrate by pilot plant techniques the operational feasibility and economic aspects of a combined biological and chemical treatment scheme for the removal of organic, nitrogenous and phosphatic pollutants from industrial and municipal wastewater.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DUX

TITLE OF PROJECT: Enzymatic Technique for Detection of Surplus Phosphorus Uptake by Activated Sludge

GRANTEE OR CONTRACTOR:
The University of Texas
at Austin
Main Building 102
Austin, Texas 78712

EPA PROJECT OFFICER:
Ed Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Austin, Texas

DESCRIPTION OF PROJECT

Award Date: May 10, 1968

Project Cost: $55,711

Completion Date: May 19, 1969

Federal Cost: $35,416

Summary:
The overall goal of this proposal is to distinguish the various mechanisms of phosphorus removal (physiochemical sorption, chemical precipitation, and "luxury biological uptake") occurring in activated sludge systems.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DXD

TITLE OF PROJECT: Sewage Phosphorus Removal by an Activated Sludge Plant

GRANTEE OR CONTRACTOR:
Sewerage Commission of the
City of Milwaukee
P. O. Box 2079
Milwaukee, Wisconsin

EPA PROJECT OFFICER:
Robert Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Milwaukee, Wisconsin

DESCRIPTION OF PROJECT

Award Date: April 1, 1968

Project Cost: $212,868

Completion Date: June 9, 1969

Federal Cost: $130,039

Summary:

1969:

1. Statistical analysis of the 1968 data using the facilities of the Marquette University Computer Center.

2. Vary significant process parameters to optimize phosphate removal.

3. Determine phosphorus mass balance on the East Plant.

4. Make a detailed evaluation of the possible mechanism of phosphorus uptake using one of the East Plant aeration tanks.

1968:

1. Demonstration of the optimization of activated sludge process parameters for maximum sewage total phosphorus removal.
2. Determination of possible correlation between activated sludge dehydrogenous activity and phosphorus removal.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DYB

TITLE OF PROJECT: Phosphorus Removal and Disposal from Municipal Wastewater

GRANTEE OR CONTRACTOR:
University of Texas
Medical Branch
Galveston, Texas 77550

EPA PROJECT OFFICER:
Dr. Edwin F. Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Galveston, Texas

DESCRIPTION OF PROJECT

Award Date: February 1, 1968
Project Cost: $141,207

Completion Date: January 31, 1970
Federal Cost: $115,874

Summary:

To demonstrate effectiveness, feasibility and costs of biological, chemical and physical processes for removal and disposal of phosphorus from Municipal wastewater.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DYM (WA 66-19)

TITLE OF PROJECT: Biological Nitrification-Denitrification Pilot Plant

GRANTEE OR CONTRACTOR: Prince William County Manassas, Virginia	**EPA PROJECT OFFICER:** M. C. Mulbarger

Project Site: Manassas, Virginia

DESCRIPTION OF PROJECT

Award Date: June 30, 1966	**Project Cost:** $1,086,000
Completion Date: June 30, 1971	**Federal Cost:** $1,086,000

Summary:

A 1.0 MGD plant, designed to remove phosphorus by "luxury" uptake and biological synthesis, features (a) no primary clarification (b) 2-stage turbine aeration, (c) intermediate solid-liquid separation by flotation, and (d) chemical precipitation of the digester supernatant. The capability of supplying liquid sodium aluminate to either the first or second state aerator is provided. Lime and alum and possibly sodium aluminate will be used to treat the digester superntant to determine nutrient removal efficiencies. A 0.2 MGD biological nitrification-denitrification pilot plant will be used to evaluate summer and winter performance and optimum design criteria and operational parameters for single stage aeration (including maximum carbon, nitrogen, and phosphorus removal by synthesis), two-stage aeration, denitrification included a study on multimedia filtration for greater nutrient removal.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DZG

TITLE OF PROJECT: Phosphorus Removal by Trickling Filter Slimes

GRANTEE OR CONTRACTOR:
Marquette University
615 North 11th Street
Milwaukee, Wisconsin 53233

EPA PROJECT OFFICER:
E. F. Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Milwaukee, Wisconsin 53233

DESCRIPTION OF PROJECT

Award Date: August 27, 1969

Project Cost: $83,304

Completion Date: August 31, 1971

Federal Cost: $66,801

Summary:

The objective of this project is to explore the possibility of greater phosphorus uptakes by trickling filter slimes under varying conditions of slime thickness, slime scour and slime environment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 DZQ

TITLE OF PROJECT: Kinetics of Algal Systems in Waste Treatment

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of California Berkeley Berkeley, California 94720	Joseph F. Roesler Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Berkeley, California

DESCRIPTION OF PROJECT

Award Date: June 1, 1967

Completion Date: May 31, 1970

Project Cost:

Federal Cost: $125,562

Summary:

The current and proposed research is investigating algal systems to determine the kinetics of algal growth and biomass production in relation to environmental factors. The ultimate objective is the development of kinetic models and parameters for use in the design, evaluation and prediction of algal waste treatment or nutrient removal systems.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 ECZ (14-12-579)

TITLE OF PROJECT: Demonstration of a Mobile Pilot Plant for Ammonia Removal From Waste Water by Selective Ion Exchange

GRANTEE OR CONTRACTOR:
Pacific Northwest Laboratories
A Division of Battelle
Memorial Institute
Richland, Washington 99352

EPA PROJECT OFFICER:
R. B. Dean
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Richland, Washington

DESCRIPTION OF PROJECT

Award Date: June 27, 1969

Completion Date: September 1970

Project Cost: $184,600

Federal Cost: $184,600

Summary:

To determine the economic feasibility of ammonia removal by selective ion exchange using sufficiently large-scale equipment for providing dependable cost data. Most of the effort on this project would be for collection of data since the necessary equipment has already been constructed.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EAP (14-12-590)

TITLE OF PROJECT: A Study on the Feasibility of Liquid Ion Exchange for Extracting Phosphates From Secondary Effluents

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
General Mills, Inc., Chemical Division 4620 W. 77th Street Minneapolis, Minnesota 55435	Mr. Dobbs Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Minneapolis, Minnesota

DESCRIPTION OF PROJECT

Award Date: June 30, 1969 **Project Cost:** $15,905

Completion Date: January 1, 1970 **Federal Cost:** $15,905

Summary:

To develop a selective liquid ion exchange reagent for removing phosphates from secondary effluent. The phosphate loaded exchanger would be stripped using either NaOH or NH_4OH and recycled in the process. Separatory funnel experiments would provide data on selectivity and capacity. A novel contacting system in which droplets of the ion exchanger would be passed up through the effluent and collected as a separate phase will be evaluated.

This is a modification of an earlier proposal No. 68-P326 "Proposal for Removing Phosphate Nitrite, and Nitrate from Municipal Sewage Effluents."

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EDA

TITLE OF PROJECT: Phosphate Removal in an Activated Sludge Facility

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Municipality of Metropolitan Seattle 410 W. Harrison Street Seattle, Washington 98119	Gary L. O'Neal Northwestern Regional Office 1200 6th Avenue Seattle, Washington 98101

Project Site: Seattle, Washington

DESCRIPTION OF PROJECT

Award Date: May 15, 1969	**Project Cost:** $273,285
Completion Date: June 30, 1972	**Federal Cost:** $188,567

Summary:

The project objective was to determine if phosphates could be removed efficiently and economically in an activated sludge plant using both biological and chemical means. Biological removal received prime consideration with chemical removal used on a plant scale only after maximum biological removal was obtained. Computerized statistical analysis of the data obtained was made to identify pertinent parameters and to allow control of the optimum operating conditions for maximum phosphate removal at all times.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1701 EDO (14-12-154)

TITLE OF PROJECT: Experiments to Determine the Effectiveness of Phosphate Removal by Means of the Moving Bed Filter

GRANTEE OR CONTRACTOR: Johns-Manville Products Corporation Research and Engineering Center Manville, New Jersey 08843 **Project Site:** Manville, New Jersey	**EPA PROJECT OFFICER:** Dr. I. Kugleman Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: May 15, 1968	**Project Cost:** $74,796
Completion Date: February 27, 1970	**Federal Cost:** $74,796

Summary:

The effectiveness of the Moving Bed Filter will be determined for the removal of suspended solids and phosphate removal as compared to conventional methods. The Moving Bed Filter (15,000 gpd) will be installed at a typical municipal waste treatment plant to optomize the flocculation and filtration procedures for phosphate and solids removal. Design and engineering data will be developed for a full-scale installation. Estimates of the capital and operating costs for various sizes of plants also will be made.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EDR

TITLE OF PROJECT: Water Treatment by Membrane Ultrafiltration

GRANTEE OR CONTRACTOR: North Carolina State University Raleigh, North Carolina 27607	EPA PROJECT OFFICER: Warren A. Schwartz Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Raleigh, North Carolina

DESCRIPTION OF PROJECT

Award Date: June 30, 1969	**Project Cost:** $56,659
Completion Date: June 30, 1972	**Federal Cost:** $52,279

Summary:

The objective is to design, construct, and implement a high pressure, dynamic flow-through ultra filtration test loop which will permit evaluation of novel membranes for sewage treatment and water pollution abatement via ultra-filtration and to study the effect of solute asymmetry on concentration polarization causing product flux reduction.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EED (14-12-800)

TITLE OF PROJECT: The Electro-Oxidation of Ammonia in Sewage to Nitrogen

GRANTEE OR CONTRACTOR:
Ionics, Incorporated
65 Grove Street
Watertown, Massachusetts 02172

EPA PROJECT OFFICER:
Carl Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site:

DESCRIPTION OF PROJECT

Award Date: June 28, 1968

Project Cost: $90,874

Completion Date: April 24, 1970

Federal Cost: $90,874

Summary:

Semiconducting electrodes will be studied with the objective of finding an electrode for the electro-oxidation of ammonia to nitrogen in wastewater. A large number of materials will be screened under a variety of operating conditions. Tests will be run on a simulated sewage effluent containing ammonia levels in the range of 10 to 30 ppm. Candidate electrode materials will be evaluated by a three step procedure: (1) conduct potential sweep tests; (2) prepare stepped potential curves for materials that look promising; and (3) for the most promising materials, place them in an electrochemical cell and run for a sufficient time to obtain reliable analytical data.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 EER (14-12-566) Continuation of 17010 FJY

TITLE OF PROJECT: Research to Develop and Demonstrate a Mobile Pilot Plant for Removal of Soluble Phosphorus from Waste Waters by Absorption on Alumina Columns

GRANTEE OR CONTRACTOR:
Pacific Northwest Laboratories
A Division of Battelle
Memorial Institute
Richaland, Washington 99354

EPA PROJECT OFFICER:
R. B. Dean
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Richland, Washington

DESCRIPTION OF PROJECT

Award Date: June 18, 1969

Project Cost: $169,314

Completion Date: June 18, 1970

Federal Cost: $169,314

Summary:

The purpose of this investigation is to determine the feasibility of using alumina columns to selectively remove phosphates from wastewater. The research would include the following phases:

(1) Engineering design of a skid mounted pilot plant to adsorb phosphates on alumina columns, to regenerate the spent columns, to recover the regenerant and to dispose of the phosphates and other wastes.

(2) Construction of the Pilot Plant

(3) Operation of the pilot plant at a local sewage treatment facility and

(4) Evaluation of the results and preparation of cost estimates for full scale facilities to utilize the process.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 1701 EEX (14-12-546)

TITLE OF PROJECT: Development of a Chemical Denitrification Process

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Rocketdyne, North American Rockwell 6633 Canoga Avenue Canoga Park, California 91304	Dr. Robert B. Dean Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Canoga Park, California

DESCRIPTION OF PROJECT

Award Date: June 9, 1969	Project Cost: $72,099
Completion Date: October 1970	Federal Cost: $72,099

Summary:

The objective of this contract extension is to determine the economic feasibility of chemical denitrification using ferrous salts. An initial exploratory study under Contract 14-12-52 showed that ferrous salts have the capability to accomplish denitrification. Continuation of that work under Contract 14-12-546 has given a good indication of technical feasibility, but has not provided answers to a number of questions that must be answered before a workable flow-through system can be defined.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EEZ (14-12-561)

TITLE OF PROJECT: Nitrogen Removal: Supplementing Ammonia Stripping with Further Nitrogen Removal by Selective Ion Exchange and Breakpoint Chlorination

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
South Tahoe Public Utility District P. O. Box AU South Lake Tahoe, Calif. 95705	Robert Dean Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: South Lake Tahoe

DESCRIPTION OF PROJECT

Award Date: June 20, 1969	Project Cost: $12,500
Completion Date: September 17, 1970	Federal Cost: $12,500

Summary:

Prepare a preliminary engineering design report including detailed cost estimates for construction of full-scale facilities for the removal of residual ammonia in the effluent from the South Lake Tahoe treatment plant. The South Tahoe Public Utility District proposes to utilize the ammonia-specific zeolite method developed by Battelle-Northwest under FWPCA Grant 26-01-67. This process can be used under low ambient temperatures where the ammonia removal methods fail. Final traces of ammonia will be removed by breakpoint chlorination.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17010 EFE (14-12-30)

TITLE OF PROJECT: "Field Demonstration of Pipeline Transportation and Land Disposal of Sludge Slurries"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Rand Development Corporation 13600 Diese Avenue Cleveland, Ohio	Dr. J. B. Farrell National Environmental Research Center Advanced Waste Treatment Research Laboratory Cincinnati, Ohio 45268

Project Site: Morgantown, West Virginia

DESCRIPTION OF PROJECT

Award Date:	January 10, 1967	Project Cost:	$126,260
Completion Date:	August 22, 1969	Federal Cost:	$126,260

Summary:

Pipeline transport of digested sewage sludge is being investigated and the economics of this practice compared with conventional filtration and solids incineration. The sludge will be transported in 2-inch diameter pipes and will be used on strip mined land and other land areas difficult to revegetate.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EFX (14-12-183)

TITLE OF PROJECT: A Study of a Process for Phosphate Removal from Water Supplies Using Lanthanum Precipitation

GRANTEE OR CONTRACTOR:
Atomics International
P. O. Box 309
Canoga Park, California 91304

EPA PROJECT OFFICER:
Dr. Sidney Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Canoga Park, California

DESCRIPTION OF PROJECT

Award Date: June 23, 1968

Project Cost: $29,167

Completion Date: October 1969

Federal Cost: $29,167

Summary:

A laboratory investigation of the steps of a new process for phosphate removal from waste water will be performed. This process involves lanthanum precipitation of the phosphate followed by an alkali lanthanum recovery cycle. The purpose of the program is to assess the technical feasibility of the process.

The speed and completeness of phosphate removal, and of each of the other process steps, as well as the extent of lanthanum and other reagent losses, will be determined parametrically in batch laboratory test using both pure solutions and sample water obtained from local treatment plants. From the results of the laboratory investigation, the technical feasibility of the process and an initial estimate of possible process economics may be determined. The results will also serve as a basis for design of an intergrated laboratory process demonstration unit, which in turn would provide design data for an actual process demonstration pilot plant.

INFORMATION SHEET CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 EGR (14-12-808)

TITLE OF PROJECT: Preliminary Experimental Investigation of Feasibility of Nitrate Removal from Wastewaters by Ion Exchange

GRANTEE OR CONTRACTOR: The Dow Chemical Company Midland, Michigan 48640	**EPA PROJECT OFFICER:** Mr. R. A. Dobbs Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Midland, Michigan

DESCRIPTION OF PROJECT

Award Date: October 29, 1969	**Project Cost:** $64,807
Completion Date: January 1, 1971	**Federal Cost:** $64,807

Summary:

The objective of this investigation was to develop an ion exchange process for removal of nitrate from wastewater. A variety of liquid exchangers was absorbed in a proous neutral bead to provide an active resin material. Selectivity for nitrate over other anions was determined. Regeneration with ammonia or other inorganic alkalies must be demonstrated.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EIP

TITLE OF PROJECT: Soluble Phosphate Removal in the Activated Sludge Process

GRANTEE OR CONTRACTOR:
The Soap and Detergent
Association
485 Madison Avenue
New York, New York 10022

EPA PROJECT OFFICER:
Robert L. Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: New York, New York

DESCRIPTION OF PROJECT

Award Date: April 1968

Project Cost: $201,413

Completion Date: September 30, 1970

Federal Cost: $156,610

Summary:

The objective of this project is to determine the feasibility of removing phosphorus in an activated sludge plant treating domestic wastewater through chemical precipitation with aluminum and utilizing only the existing aeration, settling, and sludge digestion units of the treatment plant.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1701 EKI (14-12-158

TITLE OF PROJECT: Study of the Kinetics and Nature of Precipitate Obtained in Phosphate Removal Using Iron and Aluminum

GRANTEE OR CONTRACTOR:
Atomics International
Division of North American
Rockwell Corporation
P. O. Box 309
Canoga Park, California 91304
Project Site: Canoga Park, California

EPA PROJECT OFFICER:
Dr. Sidney Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 17, 1968 Project Cost: $93,500

Completion Date: April 9, 1970 Federal Cost: $93,500

Summary:

The rate of precipitate formation and the physical nature, chemical composition and solubility of the precipitate produced in the chemical precipitation of phosphates with iron and aluminum will be investigated on a laboratory scale. Pure solutions, synthetic wastewater and wastewater from treatment plants will be used and an attempt made to explain the difference between predicted and actual phosphate removal obtained with these precipitates, to identify and explain the mode of action of wastewater components contributing to this difference, and to suggest improved techniques for obtaining more complete removal of phosphate by these chemical precipitation methods.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EKI (14-12-817)

TITLE OF PROJECT: A Study of the Kinetics and Mechanism of Precipitation and Removal of Phosphates from Wastewater

GRANTEE OR CONTRACTOR:
Atomics International Division
North American Rockwell
Corporation
Canoga Park, California

EPA PROJECT OFFICER:
Sidney A. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Canoga Park, California

DESCRIPTION OF PROJECT

Award Date: February 16, 1970
Project Cost: $50,534

Completion Date: June 1971
Federal Cost: $50,534

Summary:

The purpose of this investigation is to compare iron in the ferrous form with iron in the ferric form and aluminum as precipitants for orthophosphate and condensed phosphates in primary and secondary effluents. Reaction kinetics and stoichiometry will be investigated. Factors affecting processes for separation of precipitated phosphates will be evaluated.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 ELQ (WPRD 52-01-67)

TITLE OF PROJECT: Advanced Waste Water Treatment at South Lake Tahoe

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
South Tahoe Public Utility District South Lake Tahoe, California	Robert Dean Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: South Lake Tahoe, California

DESCRIPTION OF PROJECT

Award Date: December 27, 1966	Project Cost: $2,044,000
Completion Date: January 1, 1971	Federal Cost: $1,022,000

Summary:

The two principal objectives of the project were to evaluate the recovery and reuse of lime as a coagulant in tertiary treatment, and to investigate ammonia stripping as a means for nitrogen removal from tertiary effluent.

The report presents the results of operation at a 7.5 mgd advanced wastewater treatment plant.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 EPM

TITLE OF PROJECT: Nitrification at Low Temperatures

GRANTEE OR CONTRACTOR:
Stanford University
Stanford, California

EPA PROJECT OFFICER:
Ed Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Stanford, California

DESCRIPTION OF PROJECT

Award Date: May 20, 1970

Project Cost: $68,780

Completion Date: May 31, 1972

Federal Cost: $65,324

Summary:

The objective of this proposal is to develop a process for the efficient nitrification of effluents from municipal wastewater treatment plants. The process is to operate effectively at wastewater temperatures as low as 5°C as well as at the higher temperatures normally encountered in the field. The process termed the submerged filter will be similar in operation to the anaerobic filter which has demonstrated effectiveness for efficient biological solids capture, especially where biological solids production is low and long generation times are encountered. For these reasons, the submerged filter offers excellent promise of achieving nitrification under the stated conditions.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1701 EVB (14-12-431)

TITLE OF PROJECT: A Study of the Removal of Carbonaceous, Nitrogenous and Phosphorus Materials from Concentrated Process Waste Streams

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Engineering-Science, Inc. 150 East Foothill Blvd. Arcadia, California 91006	Mr. E. Barth Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Arcadia, California

DESCRIPTION OF PROJECT

Award Date: June 29, 1968	**Project Cost:** $44,754
Completion Date: September 29, 1969	**Federal Cost:** $44,754

. Summary:

This work is a laboratory evaluation of potential digester supernatant treatment processes. The study will include the characterization of process waste streams, the summarization and assessment of treatment technology and design and performance criteria for components of a treatment system.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1701 FAH (WPRD 51-01-67)

TITLE OF PROJECT: Soluble Phosphate Removal Demonstration

GRANTEE OR CONTRACTOR:
City of Detroit

EPA PROJECT OFFICER:
Dr. R. Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Detroit, Michigan

DESCRIPTION OF PROJECT

Award Date: January 30, 1967

Project Cost: $581,200

Completion Date: January 1970

Federal Cost: $299,800

Summary:

To ascertain and prove out an economically feasible treatment method, incorporating the activated sludge process, for removal of 80 percent of soluble phosphate from sewage.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 FBJ (14-12-179)

TITLE OF PROJECT: Selective Nitrate and Phosphate Removal

GRANTEE OR CONTRACTOR:
Process Research, Inc.
56 Rogers Street
Cambridge, Massachusetts 02142

EPA PROJECT OFFICER:
Dr. C. A. Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Cambridge, Massachusetts

DESCRIPTION OF PROJECT

Award Date: June 6, 1968	Project Cost: $132,293
Completion Date:	Federal Cost: $132,293

Summary:

A multi-membrane 2500 GPD pilot-scale prototype will be designed and constructed. It will use present commercially available membranes; the configuration will be plate-and-frame. It will be designed for 90% phosphate removal from sand or carbon filtered secondary effluent. This prototype will be operated first on a synthetic multi-component solution to verify or revise the process design. It will be operated on secondary effluent for a period of at least six months with three months of continuous 24-hour operation. Sand filtration will be used initially as a pretreatment to the process. The technical and economic feasibility of ammonium ion removal, with a modified form of this process using cation permeable membranes, will be examined. Chemical recovery, or recycle, possibilities will be examined, for the phosphate removal system alone and in combination with the ammonium removal system. This effort will include the consideration of regenerant chemicals other than sodium chloride.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 1701 FJY (14-12-413)

TITLE OF PROJECT: Evaluation of Operating Parameters of Alumina Columns for the Select Removal of Phosphorus from Wastewaters and Ultimate Disposal of Phosphorus as calcium phosphate

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Battelle Memorial Institute Pacific Northwest Laboratories Richland, Washington 99352	Dr. R. B. Dean Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Richland, Washington

DESCRIPTION OF PROJECT

Award Date: June 28, 1968	Project Cost: $38,000
Completion Date: June 28, 1969	Federal Cost: $38,000

Summary:

Alumina, as boehmite, selectively adsorbs phosphates from wastewater. Phosphates can be eluted with alkali, permitting recovery as apatite which may have a market value. The scope of proposed work will include laboratory evaluation of operating parameters to permit design of a pilot plant for the removal of phosphorus by this method, regeneration of the alumina, and determination of the feasibility of recovering the phosphorus as calcium phosphate for ultimate disposal.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 FKA (14-12-414)

TITLE OF PROJECT: Process to Remove Carbonaceous, Nitrogenous, and Phosphorus Materials from Anaerobic Digester Supernatant and Related Process Streams

GRANTEE OR CONTRACTOR:
FMC Corporation
1185 Coleman Avenue
Santa Clara, California 95052

EPA PROJECT OFFICER:
Edwin F. Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Santa Clara, California

DESCRIPTION OF PROJECT

Award Date: June 28, 1968
Project Cost: $137,421

Completion Date: March 21, 1970
Federal Cost: $137,421

Summary:

A process will be developed to remove plant nutrients and COD materials from digester supernatnat liquors. The sequence of operations to be studied involve (a) heating to remove CO_2, (b) addition of lime to precipitate phosphates and to coagulate organic matter, (c) stripping the alkaline slurry with air to remove ammonia, (d) settling the sludge to separate phosphates and COD material, and (e) recovery of the ammonia stripped from the alkaline slurry by scrubbing the air-ammonia mixture with sulfuric acid. From this work, a portable and proven pilot plant will result and estimates of plant costs developed for treating up to 3 MGD of supernatant liquors.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 1701 FKF (14-12-439)

TITLE OF PROJECT: Basic Salinogen Ion Exchange Resins for Selective Nitrate Removal from Potable and Effluent Water

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Tyco Laboratories Bear Hill Waltham, Massachusetts 02154	Mr. Robert Wise Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Waltham, Massachusetts

DESCRIPTION OF PROJECT

Award Date: June 28, 1968	**Project Cost:** $97,628
Completion Date: November 1969	**Federal Cost:** $97,628

Summary:

This program has as its primary objective development of specific anion exchange resins for removal of nitrate from water at influent levels of 20-100 ppm. The contractor will supply the necessary personnel, material and facilities, and will perform the research and development studies necessary to establish the technical and economic feasibility of nitrate removal by the method proposed. His best efforts will be exerted to develop practical syntheses for the most effective resins and to evaluate their capacity, specificity, and service life characteristics.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17010 FMX

TITLE OF PROJECT: Nitrification and Denitrification of Waste Water

GRANTEE OR CONTRACTOR: University of Minnesota Minneapolis, Minnesota 55455	EPA PROJECT OFFICER: Mr. Harold C. Foust Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Minneapolis, Minnesota

DESCRIPTION OF PROJECT

Award Date: August 14, 1967	Project Cost: $52,879
Completion Date: August 31, 1969	Federal Cost: $52,879

Summary:

The objective of this project is to construct and operate a 1 GPM pilot plant that will include a series type operation where nitrification steps will be alternated with denitrification.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17010 FSJ (14-12-900)

TITLE OF PROJECT: Pilot Plant Study of Nitrification on Plastic Media

GRANTEE OR CONTRACTOR: The Dow Chemical Company Midland, Michigan 48640	EPA PROJECT OFFICER: Edwin F. Barth Robert A. Taft Water REsearch Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Midland, Michigan

DESCRIPTION OF PROJECT

Award Date: June 30, 1970	**Project Cost:** $185,569
Completion Date: July 15, 1972	**Federal Cost:** $185,569

Summary:

The objectives of this project are: (a) to develop design parameters for producing a nitrified effluent using biological towers containing plastic media; (b) to confirm that the nitrification step also produces a further reduction of soluble organics from secondary effluent; and (c) to develop filtration technology for removal of suspended solids from a nitrified effluent.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 GNP (14-12-936)

TITLE OF PROJECT: Development of Design Manual for Advanced Waste Treatment Processes - Phosphorus Removal

GRANTEE OR CONTRACTOR:
Black and Veatch
Consulting Engineers
P. O. Box 8405
Kansas City, Missouri 64114

EPA PROJECT OFFICER:
C. L. Swanson

Project Site: Kansas City, Missouri

DESCRIPTION OF PROJECT

Award Date: September 15, 1970 Project Cost: $73,210

Completion Date: June 14, 1971 Federal Cost: $73,210

Summary:

The purpose of the design manual is to provide the design engineer and regulator agencies with up-to-date information on advanced waste treatment processes. Available information will be compiled in a form which can be readily utilized and detailed information will be included on process and equipment options, system design, and conceptual plans and specifications. Present a technical seminar to be repeated four times on modifications to conventional treatment plants for obtaining phosphorus removal. Specific plants considered will be those in Wyoming, Michigan, and Rochester, New York.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17010 HAM

TITLE OF PROJECT: Ammonia Removal in a Physical-Chemical Wastewater Treatment System

GRANTEE OR CONTRACTOR:
Ayres, Lewis, Norris & May
500 Wolverine Bldg.
Ann Arbor, Michigan 48108

EPA PROJECT OFFICER:
Francis L. Evans

Project Site: Owosso, Michigan

DESCRIPTION OF PROJECT

Award Date: March 19, 1971
Project Cost: $31,220

Completion Date: June 29, 1971
Federal Cost: $31,220

Summary:

The objective of this project is to demonstrate practical physical-chemical nitrogen removal by pilot study of breakpoint chlorination with carbon adsorption.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: WPD 128-02SI)-68

TITLE OF PROJECT: Citizen Workshops on Clean Water for America

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Izaak Walton League of America, Inc. Glenview, Illinois 60025	

Project Site: Glenview, Illinois

DESCRIPTION OF PROJECT

Award Date: February 1, 1968	**Project Cost:** $10,000
Completion Date: March 15, 1968	**Federal Cost:** $10,000

. **Summary:**

To increase citizen knowledge and understanding of the Water Quality Act of 1965 and its implications for progress in assuring clean waters for America, and to increase effectiveness of citizen participation in public discussions and hearings leading to the establishment of water quality criteria required by the Act.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1701 (14-12-52)

TITLE OF PROJECT: Dilute Solution Reactions of Nitrate Ion as Applied to Water Reclamation

GRANTEE OR CONTRACTOR:
North American Rockwell Corporation
Rocketdyne Division
6633 Canoga Avenue
Canoga Park, California

EPA PROJECT OFFICER:
R. B. Dean
National Environmental Research
Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Canoga Park, California

DESCRIPTION OF PROJECT

Award Date: January 5, 1968 **Project Cost:** $26,749

Completion Date: August 5, 1968 **Federal Cost:** $26,749

Summary:

1. Undertake a literature search of dilute solution reactions of the nitrate ion. Two groups of reactions are expected to be useful. Reduction of nitrate to nitrite, and deamination to nitrogen.

2. Carry out a testing program using the most promising chemical systems to determine feasibility of chemically decomposing nitrate ion.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 1701 (14-12-152)

TITLE OF PROJECT: Phosphorus Removal by Addition of Aluminum to the Activated Sludge Process

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
County Sanitation Districts of Los Angeles 2020 Beverly Boulevard Los Angeles, California 90057	Charles Carry

Project Site: Los Angeles, California

DESCRIPTION OF PROJECT

Award Date: January 1968	**Project Cost:** $7,500
Completion Date: April 1968	**Federal Cost:** $7,500

Summary:

The objective is to determine the reliability, efficiency and economics of the phosphorus removal process as developed by E. F. Barth and M. B. Ettinger of CWRL. The plan is to divide the three-month test period into three month-long tests as follows:

1. First month - Sodium aluminate addition.
2. Second month - Aluminum sulfate addition; lime will be added as necessary to maintain phosphate removal.
3. Third month - Both aluminum sulfate and sodium aluminate addition, the relative quantities being adjusted to maintain the pH at the optimum determined above.

Aluminum dosage in proportion to the phosphorus concentration will be optimized. The aluminum salt solutions will be added to the wastewater before the point of entry of the primary effluent into the aerator.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as ~~amended~~.*

PROJECT NUMBER: 1701 (14-12-405)

TITLE OF PROJECT: An Electrochemical Method for Removal of Phosphates

GRANTEE OR CONTRACTOR:
Dynatech Corporation
17 Tudor Street
Cambridge, Massachusetts 02139

EPA PROJECT OFFICER:
C. A. Brunner
National Environmental Research Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Cambridge, Massachusetts

DESCRIPTION OF PROJECT

Award Date: June 13, 1968 **Project Cost:** $44,113

Completion Date: September 13, 1968 **Federal Cost:** $44,113

Summary:

The technical and economic feasibility of removing phosphate from wastewater by the application of an electrolytic process using expendable metal electrodes will be determined on a laboratory scale.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

DISSOLVED REFRACTORY ORGANICS REMOVAL

7-A

DISSOLVED REFRACTORY ORGANICS REMOVAL

The classification of refractory organics may be more broadly defined as organic material which are not effectively removed by conventional biological processes. Their removal may be necessary for municipal sectors to achieve compliance with present and future water quality standards. They also may be detrimental to the quality of surface or groundwaters because of their toxic, oxygen demanding or aesthetic effects. In areas where wastewater reuse is dictated by circumstances or where it is under consideration, their removal takes on added significance because of their additive effect during normal domestic use.

The most technically advanced process for refractory organics removal is adsorption on activated granular carbon. An alternate process replaces the AGC with activated powdered carbon to take advantage of its lower cost. However, both process require reactivation of the carbon to permit its reuse for economic benefits.

Other processes are available for removal of refractory organics. Among them are chemical oxidation and reverse osmosis. Additional studies on reverse osmosis are located in section 17040.

PROJECT INDEX

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*Project Status

A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
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E - Completed but no Formal Report to be Issued

FINAL REPORTS AVAILABLE

PPB 17020 - Dissolved Refractory Organics Removal

Report Number	Title/Author	Source
17020DA002/69	Regeneration of Spent Granular Activated Carbon, Mine Safety Appliances Research Corp., Evans City, Pennsylvania	NTIS-PB 189 955
17020DA007/70	Optimization of the Regeneration Procedure for Granular Activated Carbon; Mine Safety Appliances Research Corp., Evans City, Pa.	GPO - $1.25
17020DBA03/70	Ultrafiltrative Dewatering of Spent Powdered Carbon, Amicon Corp., Lexington Massachusetts	GPO - $ .70
17020DDC06/71	Effect of Porous Structure on Carbon Activation; University of Colorado, Boulder, Colorado	GPO - $1.00
17020DHR12/70	Use of Improved Membranes in Tertiary Treatment by Reverse Osmosis; McDonnell Douglas Corp., Newport Beach, Cal.	NTIS-PB 203 206
17020DNQ09/69	Study of Powdered Carbons for Wastewater Treatment & Methods for Their Applications; West Virginia Pulp & Paper Co., Covington, West Virginia	NTIS-PB 191 538
17020DUD09/70	New Technology for Treatment of Wastewater by Reverse Osmosis; Envirogenics Co., Div. of Aerojet-General, ElMonte, Cal.	GPO - $ .70
17020DUE09/70	Light-Catalyzed Chlorine Oxidation for Treatment of Wastewater; Midwest Research Institute, Kansas City, Missouri	GPO - $1.00
17020DVJ05/69	Appraisal of Granular Carbon Contacting Phase I & II Phase III Swindell-Dressler Co., Pittsburgh, Pa.	 NTIS-PB 190 168 NTIS-PB 190 167

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17020DZ011/70	Carbon Column Operation in Waste Water Treatment; Syracuse Univ., Syracuse, N.Y.	NTIS-PB 202 579
17020ECI11/71	Feasibility Studies of Applications of Catalytic Oxidation in Wastewater; Southern Illinois Univ., Carbondale, Illinois	GPO - $ .75
17020EFA10/70	New and Ultrathin Membranes for Municipal Wastewater Treatment by Reverse Osmosis; North Star Research & Development Institute, Minneapolis, Minnesota	GPO - $ .75
17020FBD03/70	The Development of a Fluidized-Bed Technique for the Regeneration of Powdered Activated Carbon; Battelle Memorial Institute, Columbus, Ohio	GPO - $ .55
17020FKB	Advanced Wastewater Treatment Using Powdered Activated Carbon in Recirculating Slurry Contactor-Clarifiers; Infilco, Tucson, Arizona	GPO - $ .75
17020GNR10/71	Process Design Manual for Carbon Adsorption; Swindell-Dressler Co., Pittsburgh, Pa.	Tech. Transfer EPA, Washington, D. C. 20460
17020---06/70	Effect of Surface Groups on Adsorption of Pollutants; Lehigh Univ. Bethlehem, Pa.	GPO - $ .40
17020---12/68	An Investigation of Light-Catalyzed Chlorine Oxidation for Treatment of Wastewater; Midwest Research Institute, Kansas City, Mo.	NTIS-PB 187 757
17020---10/69	Photolysis Mechanisms for Pollution Abatement; ITT Research Institute, Chicago, Illinois	NTIS-PB 190 169
17020---12/68	A Comparison of Expanded Bed and Packed Bed Adsorption System; FMC Corporation Princeton, New Jersey	NTIS-PB 187 756
17020---04/69	Ozone Treatment of Secondary Effluents from Waste Water Treatment Plants; Air Reduction Company, Murray Hill, New Jersey	NTIS-PB 187 758

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DAO (14-12-469)

TITLE OF PROJECT: Laboratory Investigation of the Regeneration of Spent Activated Carbon

GRANTEE OR CONTRACTOR:
MSA Research Corporation
Evans City, Pennsylvania 16033

EPA PROJECT OFFICER:
A. N. Masse
National Environmental Research Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Evans City, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: October 31, 1968 **Project Cost:** $85,396

Completion Date: July 31, 1970 **Federal Cost:** $85,396

. Summary:

This work is a study on regeneration of spent granular activated carbon. The goal of this study is to decrease the physical losses of granular carbon which occur during regeneration and, in addition, to increase the adsorption capacity of regenerated carbon over that presently obtainable. The project includes work on the effect of particle size, the mechanism of fines formation, the effect of CO_2 in the activated gases, and gas analysis as a control parameter, several adsorption-regeneration cycles to demonstrate the validity of the work, and the regeneration of several batches of carbon from different manufacturers.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DBA (14-12-528)

TITLE OF PROJECT: "Ultrafiltrative Dewatering of Spent Carbon from the Powdered Carbon Process"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Amicon Corporation 25 Hartwell Avenue Lexington, Massachusetts 02173	Gerald Berg National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Lexington, Massachusetts

DESCRIPTION OF PROJECT

Award Date: April 22, 1969 — Project Cost: $39,500

Completion Date: March 31, 1970 — Federal Cost: $39,500

Summary:

The technical feasibility of concentrating spent powdered carbon slurry by ultrafiltration membranes was demonstrated. The study evaluated polymeric flocculants and deflocculants, and their effect upon such parameters as flux, operating pressure and final solids concentration.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 DDC

TITLE OF PROJECT: Effect of Porous Structure on Carbon Activation

GRANTEE OR CONTRACTOR:
University of Colorado
Boulder, Colorado

EPA PROJECT OFFICER:
Robert Wise
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Boulder, Colorado

DESCRIPTION OF PROJECT

Award Date: June 1, 1967

Project Cost: $46,021

Completion Date: December 31, 1969

Federal Cost: $44,966

Summary:

Reaction rates and porous structures of a calcined Wyoming coal activated by air and carbon dioxide and a graphite activated by carbon dioxide were measured. Total macropore and micropore volumes, surface area and pore-size distributions were determined as functions of burnoff.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DDV

TITLE OF PROJECT: "Photochemical Reactions in Water and Air Pollution"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of California Davis, California 95616	Robert A. Wise Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Davis, California	

DESCRIPTION OF PROJECT

Award Date:	September 12, 1968	Project Cost:	$30,640
Completion Date:	July 31, 1969	Federal Cost:	$23,382

Summary:

The overall objective is to derive methods for designing flow-type reactors for photochemical reactions in gas, liquid, and heterogeneous systems. More specifically methods are being studied for scaleup to commercial size of laboratory reactors for photochemcial reactions, which normally involve complex and chain kinetics. The fundamental results are to be applied to the development of such processes as water purification by photolysis or photo-oxidation.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 DFG

TITLE OF PROJECT: "Photodegradation of Polymers in Aqueous Solutions"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Clarkson College of Technology Potsdam, New York 13676	Mr. Evans Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Potsdam, New York	

DESCRIPTION OF PROJECT

Award Date: Sept 25, 1968 Project Cost: $13,150

Completion Date: Sept 30, 1968 Federal Cost: $11,947

Summary:

The aim of this research is the elucidation of the kinetics and mechanism of the photolysis of watersoluble, in the first instance, synthetic polymers by ultraviolet or near ultraviolet light. Photodegradation of polymers has been neglected in favor of investigation of irradiation of polymers by high energy radiation such as X-rays, electrons, v-rays and neutrons.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DHR
(14-12-417)

TITLE OF PROJECT: "Use of Improved Membranes in Tertiary Treatment by Reverse Osmosis"

GRANTEE OR CONTRACTOR:
McDonnel-Douglas Corporation
5301 Bolsa Avenue
Huntington Beach, California 92647

EPA PROJECT OFFICER:
Gerald Stern
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Huntington Beach, Calif.

DESCRIPTION OF PROJECT

Award Date: Feb 12, 1969

Completion Date: July 31, 1970

Project Cost: $88,460

Federal Cost: $88,460

Summary:

The objective of this project is to determine the applicability of improved cellulose acetate reverse osmosis membranes to the treatment of wastewaters, and an extended testing of performance.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DJT

TITLE OF PROJECT: "Radioisotope Tracer Study of Membrane Purification"

GRANTEE OR CONTRACTOR: Clarkson College of Technology Potsdam, New York 13676	EPA PROJECT OFFICER: W. Schwartz Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Potsdam, New York	

DESCRIPTION OF PROJECT

Award Date: October 9, 1968	Project Cost: $31,802
Completion Date: May 4, 1970	Federal Cost: $29,630

Summary:

The objectives of this project are to improve our understanding of the convective diffusion processes in reverse osmosis systems and in particular the effect of the solute concentration building near the membrane upon the transport characteristics of these membranes. Radioactive tracers will be used to study concentration profiles in a batch system. Comparisons will be made with theoretical description presently under development. Extensions of this work to multicomponent-solute batch systems and to two-dimensional parallel-plate type systems are considered to be the next logical developments.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DNQ (14-12-75)

TITLE OF PROJECT: Study of Powdered Carbons for Wastewater Treatment and Methods for their Application

GRANTEE OR CONTRACTOR:
West Virginia Pulp and Paper Company
Covington, Virginia

EPA PROJECT OFFICER:
Mr. A. N. Masse
National Environmental Research Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Covington, Virginia

DESCRIPTION OF PROJECT

Award Date: August 20, 1968

Project Cost: $3,700

Completion Date: September 30, 1969

Federal Cost: $3,700

Summary:

This study is designed to improve the economics and/or performance of the powdered activated carbon contacting process for renovation of wastewater by (a) development of a powdered carbon with a greater adsorptive capacity per unit cost, (b) an improvement in the carbon characteristics to eliminate simply one or more operations in the contacting process, or (c) changes in the equipment or carbon used to reduce or eliminate the need for a coagulating agent. Various types of carbons will be evaluated by a variety of techniques so that their properties may be correlated with performance. The carbons will be evaluated initially in the laboratory to determine which are the most promising ones for further study in the contacting apparatus. A multistage countercurrent apparatus for contacting powdered carbons with wastewater has been designed. Activated sludge secondary effluent will be used as feed to the apparatus.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 DUD (14-12-553)

TITLE OF PROJECT: New Technology for Treatment of Wastewater by Reverse Osmosis

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Aerojet-General Corporation 9200 East Flair Drive El Monte, California 91734	Mr. J. Smith National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: El Monte, California

DESCRIPTION OF PROJECT

Award Date:	June 4, 1969	**Project Cost:**	$116,058
Completion Date:	September 30, 1970	**Federal Cost:**	$116,058

Summary:

Stable high flux membranes were used to renovate wastewater by reverse osmosis. Membranes were formulated that produced fluxes greater than 60 gal/ft^2-day which decreased less than 20% after one year of operation. The unit rejected 60% of the sodium sulfate when tested at 600PSI with 1000 PPM feed solution. Enzymatic laundry presoak were used to clean membranes and restore fluxes to 80 to 90% of initial values.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DUE (14-12-531)

TITLE OF PROJECT: Advanced Study of Light-Catalyzed Chlorine Oxidation for Large-Scale Treatment of Wastewater

GRANTEE OR CONTRACTOR:
Midwest Research Institute
425 Volker Boulevard
Kansas City, Missouri 64110

EPA PROJECT OFFICER:
Robert A. Wise
National Environmental Research Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Kansas City, Missouri

DESCRIPTION OF PROJECT

Award Date: May 1, 1969 **Project Cost:** $88,480

Completion Date: September 30, 1970 **Federal Cost:** $88,480

Summary:

The objective was to determine the optimum ultraviolet light source and exposure time necessary for destruction of soluble organic materials in wastewater.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DVJ (14-12-105)

TITLE OF PROJECT: Appraisal of Contacting Systems for Granular Activated Carbon Adsorption Treatment of Wastewater

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Swindell-Dressler Company Pittsburgh, Pennsylvania	A. N. Masse National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Pittsburgh, Pennsylvania

DESCRIPTION OF PROJECT

Award Date:	February 24, 1969	**Project Cost:**	$16,082
Completion Date:	May 31, 1969	**Federal Cost:**	$16,082

Summary:

This study provides design of selected carbon-wastewater contacting systems capable of providing removals specified, to estimate capital and operating costs and to recommend the system best suited for various flow rates. The most economical carbon contacting system for a given application will probably be a function, primarily, of design capacity.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DVK

TITLE OF PROJECT: **"Applicability of ARDOX Catalysts to the Oxidation of Municipal Sewage Effluents and of Wastes Produced During Manned Space Flight"**

GRANTEE OR CONTRACTOR:

Arde Incorporated
580 Winters Avenue
Paramus, New Jersey 07652

EPA PROJECT OFFICER:

R. H. Wise
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: **Paramus, New Jersey**

DESCRIPTION OF PROJECT

Award Date: **March 11, 1969**

Project Cost: **$77,900**

Completion Date: **Nov, 1969**

Federal Cost: **$77,900**

Summary:

This is a proposal of Arde, Incorporated to investigate the applicability of ARDOX catalysts to oxidize organic constituents in sewage effluents by use of gaseous oxygen. Extensive, but preliminary, in-house laboratory tests have shown that the oxygen can contact and oxidize secondary effluent or dilute ABS solution in the presence of the unsupported catalyst in an agitated batch reactor (Waring Blender) or in the presence of a supported catalyst in a flow reactor (spray contact or atomizing contact). The oxidation of the effluent in these reactors occurs at 40 to 70°F and 0 to 1 psig.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 DYC (14-12-597)

TITLE OF PROJECT: "Design, Construction, and Operation of a Pilot Plant for the treatment of Secondary Effluent from Waste Treatment Plants with Ozone"

GRANTEE OR CONTRACTOR:

AIRCO Central Research Laboratories
Murray Hill, New Jersey 07974

EPA PROJECT OFFICER:

F. L. Evans
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Murray Hill,
New Jersey

DESCRIPTION OF PROJECT

Award Date: June 30, 1969
Project Cost: $636,820

Completion Date: Dec 31, 1972 1
Federal Cost: $636,820

Summary:

The purpose of the investigation is to establish the economic feasibility of ozone oxidation as a process for the removal of organic compounds from waste water. To obtain dependable results, the study will be conducted at a 50,000 gpd pilot scale.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 DZO

TITLE OF PROJECT: Carbon Column Operation in Waste Water Treatment

GRANTEE OR CONTRACTOR: Syracuse University - Research Institute	EPA PROJECT OFFICER: Robert Smith National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Syracuse, New York

DESCRIPTION OF PROJECT

Award Date: May 14, 1968	Project Cost: $142,567
Completion Date: April 30, 1971	Federal Cost: $138,204

Summary:

A mathematical model has been devised to simulate the adsorption and filtration of waste water in an isothermal column packed with granular activated carbon. The adsorption process is considered to be controlled by a combination of liquid phase diffusion and interparticle diffusion which can be approximated by a solid phase rate expression based upon Glueckauf's Linear Driving Force. The filtration rate equation is assumed to be the same as that of filtration of clay suspension in a carbon bed, which was investigated experimentally as a companion study in this work. The effects of column backwashing and regeneration are also included in the model.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 ECI (14-12-572)

TITLE OF PROJECT: Determining the Feasibility Catalytically Oxidizing Organic Materials in Waste Water in the Presence of Ultrasonic Energy"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Southern Illinois University Carbondale, Illinois 62901	Francis R. Evans National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Carbondale, Illinois

DESCRIPTION OF PROJECT

Award Date: June 25, 1969	Project Cost: $35,560
Completion Date: April 30, 1972	Federal Cost: $35,560

. Summary:

A feasibility study on the synergetic effect of ultrasonics and catalysis upon wastewaters. This is primarily directed to COD reduction.

The study proposes to establish optimum operating conditions and establish a scope of possible application to wastewaters.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 EFA (14-12-587)

TITLE OF PROJECT: Studying New and Ultrathin Membranes for Municipal Waste Water Treatment by Reverse Osmosis

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
North Star Research and Development Institute 3100 - 38th Avenue, South Minneapolis, Minnesota 55406	Carl Brunner National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Minneapolis, Minnesota

DESCRIPTION OF PROJECT

Award Date:	June 30, 1969	**Project Cost:**	$70,165
Completion Date:	October 31, 1970	**Federal Cost:**	$70,165

Summary:

Developed for treatment of waste water ultrathin reverse osmosis films of various polymers. Long term (150 hours) testing gave an average water flux of 34 to 36 gfd over the last 100 hours. Treatment with enzyme active laundry presoak was effective in cleaning the membranes and restoring the flux to levels existing before fouling.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract) *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 EFB (14-12-585)

TITLE OF PROJECT: Physical-Chemical Treatment of Municipal Waste

GRANTEE OR CONTRACTOR:
The Elmco Corporation
634-666 South Fourth
West Street
Salt Lake City, Utah 84104

EPA PROJECT OFFICER:
James J. Westrick
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Salt Lake City, Utah

DESCRIPTION OF PROJECT

Award Date: June 30, 1969

Project Cost: $594,864

Completion Date: July 31, 1971

Federal Cost: $594,864

Summary:

The objective of this project is to determine on a pilot scale the feasibility of the physical-chemical treatment of raw sewage by chemical coagulation and precipitation followed by adsorption by powdered activated carbon and dual-media filtration. This treatment combination should produce a high quality water with very low pollutional load and with potential for a number of reuse possibilities. Additional funds provided to build and install a fluidized-bed powdered carbon regeneration system as a step in a physical-chemical treatment system.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 EFD (14-12-839

TITLE OF PROJECT: Electrochemical Regeneration of Spent Activated Carbon

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
McDonnell Douglas Astronautics Company 2121 Campus Drive Newport Beach, Calif. 92660	Charles E. Myers Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Newport Beach, California

DESCRIPTION OF PROJECT

Award Date: April 7, 1970	**Project Cost:** $45,000
Completion Date: May 7, 1971	**Federal Cost:** $45,000

Summary:

The objective of this project is to determine the technical feasibility of an electrochemical method for regeneration of spent activated carbon.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: **17020 EKL (14-12-832)**

TITLE OF PROJECT: **"Removal of Powdered Carbon in Sewage Effluents by Cross-Flow Filtration"**

GRANTEE OR CONTRACTOR:

Oak Ridge National Laboratory
Oak Ridge, Tennessee

EPA PROJECT OFFICER:
Warren A. Schwartz
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: **Oak Ridge, Tennessee**

DESCRIPTION OF PROJECT

Award Date: **April 23, 1970**

Project Cost: **$145,000**

Completion Date: December 31, 1972

Federal Cost: **$145,000**

Summary:

The objective of this contract is to determine the technical and economic feasibility of cross-flow filtration for the separation and concentration of powdered activated carbon from various municipal waste streams including primary effluent, clarified primary effluent and secondary effluent. Cross-flow filtration may be defined **for purposes of this contract as a separation process in which powdered activated carbon suspensions flow under pressure tangentially past a porous support, such as woven fiber hose, with hydrodynamic conditions adjusted such that excessive cake buildup on the filter medium is prevented. The object will be to remove adsorbent carbon from these feed streams and to concentrate it at high production rates. Variables to be examined will include the following: Operating pressure, carbon concentration, carbon-to-sewage ratio, contact time, support structure and cross-flow velocity. Effectiveness of the technique will be judged primarily on the basis of fluxes obtained, clarity of the product and organic carbon removal.**

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 EPF

TITLE OF PROJECT: "Adsorption from Aqueous Solution"

GRANTEE OR CONTRACTOR:

The University of Michigan
Ann Arbor, Michigan 48104

Project Site: Ann Arbor,
Michigan

EPA PROJECT OFFICER:

Carl A. Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: Apr 22, 1968

Completion Date: Nov 24, 1969

Project Cost: $89,626

Federal Cost: $87,139

Summary:

The objective of the research is the definition and description of adsorption phenomena associated with the uptake of organic pollutants from waters and wastewaters by active carbon, and the delineation of factors which govern rates and equilibria of adsorption from aqueous solution.

The studies include a detailed investigation of the adsorption process and of the mass-transfer properties of different adsorption systems, and a detailed comparison of various conditions of operation from the points of view of efficiency and effectiveness of removal of persistent organic pollutants.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 EVQ

TITLE OF PROJECT: Photochemical Methods for Purifying Water

GRANTEE OR CONTRACTOR: University of California, Davis Davis, California 95616	**EPA PROJECT OFFICER:** R. H. Wise National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Davis, California

DESCRIPTION OF PROJECT

Award Date: October 30, 1970	**Project Cost:** $85,054
Completion Date: March 31, 1972	**Federal Cost:** $67,007

Summary:

The objective of this project is the evaluation and costs of photo-oxidation as a process for reducing the organic pollutants in secondary effluents.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 FBD (14-12-113)

TITLE OF PROJECT: The Development of a Fluidized Bed Technique for the Regeneration of Powdered Activated Carbon

GRANTEE OR CONTRACTOR:

Batelle Memorial Institute
Columbus Laboratories
Columbus, Ohio

Project Site: Columbus, Ohio

EPA PROJECT OFFICER:

E. L. Berg
Robert A. Taft Water Research
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 30, 1967

Project Cost: $55,900

Completion Date: December 31, 1969

Federal Cost: $55,900

Summary:

This study was directed toward the development of a fluidized-bed regeneration technique. Two fluidized-bed systems were considered: one in which the carbon was regenerated in a fluidized bed of inert material, and another in a pulsating fluidized bed system where the carbon served as the bed material. Both techniques were effective in restoring spent carbon to over 90% of its original adsorptive capacity.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) ,
Federal Water Pollution Control Act (PL 84-660), as *amended.*

PROJECT NUMBER: 17020 FEV (14-12-896)

TITLE OF PROJECT: "Hydrodynamic Control of Flux of Cellulose Acetate Membranes Used in Hyperfiltration of Municipal Sewage Effluents"

GRANTEE OR CONTRACTOR:
Oak Ridge National Laboratory
Post Office Box Y
Oak Ridge, Tennessee 37830

EPA PROJECT OFFICER:
John M. Smith
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Oak Ridge, Tennessee

DESCRIPTION OF PROJECT

Award Date: July 31, 1970 **Project Cost:** $90,000

Completion Date: October 31, 1971 **Federal Cost:** $90,000

Summary:

This study evaluates hydrodynamic methods such as increased axial velocities and turbulence promoters as a means of controlling the fouling potential of primary and secondary effluents when processed in tubular reverse osmosis units.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 FKB (14-12-400)

TITLE OF PROJECT: Advanced Wastewater Treatment Using Powdered Activated Carbon in Recirculating Slurry Contactor-Clarifiers

GRANTEE OR CONTRACTOR:
Infilco
P. O. Box 5033
Tucson, Arizona 85703

EPA PROJECT OFFICER:
E. F. Harris
National Environmental Research Center, AWTRL
Cincinnati, Ohio 45268

Project Site: Tucson, Arizona

DESCRIPTION OF PROJECT

Award Date: June 6, 1968

Completion Date: July, 1970

Project Cost: $65,950

Federal Cost: $65,950

Summary:

The objective of this project is to determine the process and operating parameters for adsorption of dissolved impurities from the secondary effluent of a municipal activated sludge plant by powdered activated carbon in two stages of continuously recirculating slurry contactor-clarifiers.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 GDN (14-12-901)

TITLE OF PROJECT: Improving Granular Carbon Treatment

GRANTEE OR CONTRACTOR:
FMC Corporation
Chemical Research &
Development Center
Princeton, New Jersey

EPA PROJECT OFFICER:
C. A. Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Princeton, New Jersey

DESCRIPTION OF PROJECT

Award Date: June 26, 1970
Project Cost: $63,584

Completion Date: June 30, 1971
Federal Cost: $63,584

Summary:

The magnitude and effects of biological activity in expanded carbon beds used for direct clarification/adsorption treatment of wastewater were investigated. Major aspects of the project involved comparisons of the relative effectiveness of aerobic and anaerobic conditions in the expanded-bed systems, and a comparison of the relative treatment effectiveness of expanded carbon beds of high and low sorptive activity under aerobic operating conditions.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17020 GNR (14-12-928)

TITLE OF PROJECT: "Development of Design Manual for Advanced Waste Treatment Processes - Activated Carbon Adsorption"

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Swindell-Dressler Co.	Chuck Swanson
Division of Pullman Inc.	Environmental Protection Agency
441 Smithfield Street	CM #2
Pittsburgh, Pennsylvania	Room 800
15222	Washington, D. C. 20460

Project Site: Pittsburgh, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: August 25, 1970 **Project Cost:** $35,907

Completion Date: February 24, 1971 **Federal Cost:** $35,907

. **Summary:**

The design manual provides the design engineer and regulatory agencies with up-to-date information on advanced waste treatment processes. Available information is compiled in a form which can be readily utilized with detailed information included on process and equipment options, system design, and conceptual plans and specifications. Present four technical seminars on procedures and considerations involved in design of granular activated carbon treatment plants.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17020 GPA

TITLE OF PROJECT: Organic Decomposition at Poised O-R Potential Levels

GRANTEE OR CONTRACTOR:
The University of Michigan
Ann Arbor, Michigan

EPA PROJECT OFFICER:
Mr. Harold C. Foust
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Ann Arbor, Michigan

DESCRIPTION OF PROJECT

Award Date: December 7, 1967

Project Cost: $123,942

Completion Date: August 31, 1969

Federal Cost: $123,942

Summary:

The object of this study is to understand the importance of electrode potential measurements to anaerobic digestion.

Two banks of laboratory digesters, consisting of three units in each bank, were used to study the effects of chemical poisoning as compared to electrical poisoning.

Dual compartment digestion units were used with dialysis membranes separating the acid forming from the methane forming bacteria. In one such unit mixed cultures were studied, while in the other, pure cultures of methane organisms were fed through the membrane by mixed cultures of acid formers. Electrode potentials and other parameters were observed.

A conical head digester determined the instantaneous response of the unit in terms of gaseous components to perturbations.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 HAL (68-01-0040)

TITLE OF PROJECT: "Electrochemical Regeneration of Spent Activated Carbon"

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Environics, Inc. 1430-B Village Way South Santa Ana, California 92705	Charles E. Myers Treatment and Control Optimization Section Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Santa Ana, California

DESCRIPTION OF PROJECT

Award Date: May 4, 1971	**Project Cost:** $49,967
Completion Date: May 15, 1972	**Federal Cost:** $49,967

Summary:

The objectives of this project are: (1) to determine the efficiency and power requirements for the electrochemical regeneration of granular activated carbon spent on purification of municipal wastewater; and (2) to demonstrate the feasibility of electrochemically regenerating activated carbon spent in removing contaminants from space cabin atmosphere.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 HDP (14-12-150 Mod 7)

TITLE OF PROJECT: "Physical-Chemical Treatment at Pomona, California

GRANTEE OR CONTRACTOR:
County Sanitation Districts of
Los Angeles County
2020 Beverly Boulevard
Los Angeles, California 90057

EPA PROJECT OFFICER:
Arthur N. Masse
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Pomona, California

DESCRIPTION OF PROJECT

Award Date: January 1968

Project Cost: $782,400

Completion Date: October 31, 1971

Federal Cost: $782,400

Summary:

The objective of this project is to develop optimum operating conditions for wastewater treatment employing the clarification/carbon process as a replacement for conventional biological treatment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 WP-00969-03

TITLE OF PROJECT: "Effect of Surface Groups on Adsorption of Pollutants"

GRANTEE OR CONTRACTOR:

Lehigh University
Bethlehem, Pennsylvania 18015

EPA PROJECT OFFICER:

Dr. Rosen
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: **Bethlehem, Pennsylvania**
Lehigh University

DESCRIPTION OF PROJECT

Award Date: **June 28, 1968** Project Cost: **$71,929**

Completion Date: June , 1970 Federal Cost: **$21,715**

Summary:

To develop a theoretical basis to describe the action of activated carbon in adsorption of mixed complex biological materials from aqueous solution. A particular objective is to develop the theory for understanding properties of carbon in advanced waste treatment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 WP-01129-02

TITLE OF PROJECT: Studies in Foam Separation and Related Techniques

GRANTEE OR CONTRACTOR:

Northeastern University
Boston, Massachusetts

EPA PROJECT OFFICER:

F. L. Evans
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Northeastern University
Boston, Massachusetts

DESCRIPTION OF PROJECT

Award Date: June 17, 1968

Project Cost: $32,286

Completion Date: December 31, 1968

Federal Cost: $14,611

Summary:

Foam separation of Fe and Hg at concentrations 10 ^{4}M and the mechanism of solvent sublation for the removal of organics at concentration of 10 $^{-9}$M have been studied. It is proposed to investigate the use of both methods for the removal of amines, pesticides, and other organics at trace concentrations.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 (WP-01209-01)

TITLE OF PROJECT: Metal-Catalyzed Oxidations of Organic Contaminants

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Kent State University Kent, Ohio	R. C. Brenner Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Kent State University
Kent, Ohio

DESCRIPTION OF PROJECT

Award Date: October 12, 1967	Project Cost: $33,922
Completion Date: October 31, 1968	Federal Cost: $33,922

Summary:

This study evaluates metal catalysis of certain organic contaminants in polluted water, in particular, the conversion of sulfhydryl groups, sulfide groups, amine linkages, and sites of carbon-carbon unsaturation to significantly less toxic species.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 (WP-01243-01)

TITLE OF PROJECT: Refractory Adsorption on Chemcoke

GRANTEE OR CONTRACTOR:
Vanderbilt University
Nashville, Tennessee

EPA PROJECT OFFICER:
James J. Westrick
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Vanderbilt University
Nashville, Tennessee

DESCRIPTION OF PROJECT

Award Date: September 13, 1967 **Project Cost:** $78,612

Completion Date: September 30, 1968 **Federal Cost:** $42,492

Summary:

It is proposed to determine the equilibrium data for CHEMCOKE chars when adsorbing dissolved solutes from both the influent to a waste treatment plant and the effluent from the secondary treatment stage. For chars showing promise, the response of a fixed bed to loading will be determined. Runs for comparing the proposed chars with activated carbon types now used will be made. The general behavior of fixed beds in water treatment applications will be made.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 (WP-01284-02)

TITLE OF PROJECT: Foam Separation Flotation of Colloid Organic Systems

GRANTEE OR CONTRACTOR:
University of Kentucky
Research Foundation
Lexington, Kentucky 40406

EPA PROJECT OFFICER:
F. L. Evans
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Lexington, Kentucky

DESCRIPTION OF PROJECT

Award Date: May 10, 1968 **Project Cost:** $54,596

Completion Date: November 30, 1969 **Federal Cost:** $35,174

Summary:

The overall objective of this investigation is the establishment of definite design criteria for specific, continuous foam separation processes. The processes will include foam fractionation-flotation of colloidal and soluble iron from water supplies, the ion flotation of hexavalent chromium from plating wastes, the foam fractionation of sulphate, sulphite, and lignin-containing waste from pulp and paper mills, and the ion flotation of free and complexed cyanide. The processes will be conducted on a continuous-flow basis. An economic evaluation will be carried out and definite recommendation on the applicability of each process will be made.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 (WP-01371-01A1)

TITLE OF PROJECT: Sorption Behavior of Organic Pyropolymers in Aqueous Solution

GRANTEE OR CONTRACTOR:
The Catholic University
of America
Washington, D. C. 20017

EPA PROJECT OFFICER:
Mr. Harold C. Foust
Environmental Protection Agency
Office of Research and Monitoring
Washington, D. C. 20460

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date: June 4, 1968

Project Cost: $20,018

Completion Date: February 4, 1969

Federal Cost: $17,927

Summary:

A feasibility study of a pyropolymer as an adsorbent for an organic herbicide and an organic insecticide by determining rates of sorption and desorption, quantity of material adsorbed, and regeneration techniques.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 Contract, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 (14-12-72)

TITLE OF PROJECT: **"An Investigation of Ligh-Catalyzed Chlorine Oxidation for Treatment of Waste Water"**

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Midwest Research Institute	R. H. Wise Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Kansas City, Missouri Missouri

DESCRIPTION OF PROJECT

Award Date:	January 1968	Project Cost:	$49,960
Completion Date:	December 1968	Federal Cost:	$49,960

Summary:

The purpose of the study is to investigate the effect of light on rate and extent of chlorine oxidation of a variety of organic materials typical of those found in wastewater and representative samples of effluent from biological treatment plants; to determine the capabilities of light-catlyzed chlorine oxidation and to make an economic analysis for the feasibility of such treatment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 (14-12-114)

TITLE OF PROJECT: Ozone Treatment of Secondary Effluents from Waste Water Treatment Plants

GRANTEE OR CONTRACTOR:
Air Reduction Company
Murray Hill, New Jersey

EPA PROJECT OFFICER: Mr. F. L. Evans
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Murray Hill, New Jersey

DESCRIPTION OF PROJECT

Award Date: June 30, 1967

Project Cost: $90,783

Completion Date: June 30, 1968

Federal Cost: $90,783

. **Summary:**

The objective of this study was to evaluate the feasibility of ozone as a method for removing refractory organics.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 Contract *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17020 (14-12-196)

TITLE OF PROJECT: "A Study of the Effect of Ultrasonic Energy on Waste Water"

GRANTEE OR CONTRACTOR:

American Process Equipment Corp.
5331 West 104th Street
Los Angeles, California 90045

Project Site: Los Angeles, California

EPA PROJECT OFFICER:

Dr. F. A. Rohrman
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date:	June 24, 1968	Project Cost:	$29,129
Completion Date:	December 31, 1968	Federal Cost:	$29,129

Summary:

A study of the effect of ultrasonic energy on three characteristics of waste water, namely; disinfection, ammonia nitrogen content and refractory organic content. The feed water was processed through two different air-operated ultrasonic atomizers, one operating at 50 KHz and the other at 100 KHz. An ultrasonic atomizing nozzle energized by an electro restrictive transdoer-horn assembly operating at a frequency of 20 KHz was evaluated.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract)*,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 (14-12-433)

TITLE OF PROJECT: Photolysis Mechanisms for Pollution Abatement

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
IIT Research Institute 10 West 35th Street Chicago, Illinois 60616	R. A. Dobbs National Environmental Research Center, AWTRL Cincinnati, Ohio 45268

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date: June 1968 **Project Cost:** $49,982

Completion Date: October 1969 **Federal Cost:** $49,982

Summary:

To determine the feasibility of oxidizing the soluble organic materials in wastewater by contacting the water with photoreactive materials. The photoreactive materials would be those capable of producing active oxidizing species upon exposure to sunlight or the light from inexpensive artificial sources.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17020 (14-12-459)

TITLE OF PROJECT: A Comparison of Expanded Bed and Packed Bed Adsorption System

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
FMC Corporation Princeton, New Jersey	Carl A. Brunner Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Princeton, N. J.	

DESCRIPTION OF PROJECT

Award Date: October 15, 1968	**Project Cost:** $81,461
Completion Date: January 15, 1970	**Federal Cost:** $81,461

Summary:

This study determined the feasibility of removing organic materials from primary effluent using granular activated carbon in an upflow expanded bed.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

SUSPENDED AND COLLOIDAL SOLIDS REMOVAL

8.4

SUSPENDED AND COLLOIDAL SOLIDS REMOVAL

The topics of coagulation, flocculation, flotation, filtration and sedimentation are investigated in this subprogram. Emerging from those efforts are significant insights and technology advances in the technology of filtration kinetics, metal addition, use of polyelectrolytes to improve coagulation and new and improved filtration methods.

From data gathered in the pilot plant and demonstration programs, design criteria were collected, and published in the form of a design manual covering the subject of suspended and colloidal solids removal. The topics of flow equalization, coagulation of wastewater, chemicals and feeding, chemical processes, gravity systems, physical straining processes, deep bed filtration as well as operation, maintenance and equipment costs are reviewed in the manual.

PROJECT INDEX

PPB 17030 - Suspended and Colloidal Solids Removal

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DKG	Iowa State University	C	8-11
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WP-01021	Illinois Institute of Technology	E	8-40
WP-01068	University of California	E	8-41
WP-01268	Illinois Institute of Technology	E	8-42

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

FINAL REPORTS AVAILABLE

PPB 17030 - Suspended and Colloidal Solids Removal

Report Number	Title/Author	Source
17030EOH01/70	Application of Hyperfiltration to Treatment of Municipal Sewage Effluents; by Oak Ridge National Lab., Oak Ridge, Tenn.	GPO $ .70
17030ESX04/70	Investigation of a High-Pressure Foam Wastewater Treatment Process; by Garrett Research and Development Co., Inc., LaVerne, Cal.	GPO $ .45
17030FEB02/72	Fluidic Vortex Bubble Generator; by Bowles - Fluidics Corporation, Silver Spring, Md.	GPO - $1.00
17030FWH01/72	Filtration of Municipal Waste with a Moving Bed Contactor; Research Triangle Institute, Research Triangle Park, N.C.	GPO - $ .60
17030GNO	Design Manual for Advanced Waste Treatment Processes - Suspended Solids Removal; by Burns & Roe, Inc., Oradell, N.J.	Technology Transfer

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17030 DFM

TITLE OF PROJECT: "Kinetics and Mechanism in Activated Sludge Processes"

GRANTEE OR CONTRACTOR:
Oklahoma State University
Stillwater, Oklahoma 74074

EPA PROJECT OFFICER:
Dr. Brenner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Stillwater, Oklahoma

DESCRIPTION OF PROJECT

Award Date: August 25, 1967

Project Cost: $29,409

Completion Date:

Federal Cost: $29,409

Summary:

(1) A detailed mathematical analysis of operational kinetic equations will be made, and a family of design curves will be developed, which can be used for various values of kinetic constants and operational parameters. (2) Experimental work will be completed on the extent of production and conditions under which organic metabolic products are made and released by the microbial population during metabolism of the original oxogenous carbon source. (3) A large portion of the research will be devoted to statistical analysis, correlation and conclusive summarization of all experimental results obtained during the entire course of projects WP-00325, WP-00075, and WP-00786.

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INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DGQ

TITLE OF PROJECT: "Removal of Colloidal Matter from Waste Water"

GRANTEE OR CONTRACTOR:
University of Minnesota
Minneapolis, Minnesota

EPA PROJECT OFFICER:
Dr. Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Minneapolis, Minnesota

DESCRIPTION OF PROJECT

Award Date:	Sept 13, 1967	Project Cost:	$31,331
Completion Date:	Aug 31, 1970	Federal Cost:	$79,936

Summary:

The objectives of the proposed investigation is to elucidate the mechanisms by which microorganism contribute to the removal and metabolism of organic colloidal matter from dilute solutions. Removal involves mass transfer of the colloidal particles from the bulk solution to the biochemically active site. Metabolism refers to the sequence of enzymatic biochemical reactions which break up the colloid into soluble components which are utilized for energy and growth. This information will be used to formulate theoretically based rate equations to describe mass transfer and overall metabolism of colloidal particles as a function of the physical-chemical properties of the particles and of the solvent. The rate equations will be tested experimentally in batch systems and in continuous flow systems.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DHH

TITLE OF PROJECT: "Foam Fractionation with Reflux"

GRANTEE OR CONTRACTOR:

University of Cincinnati
Cincinnati, Ohio 45221

EPA PROJECT OFFICER:

Dr. Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Cincinnati, Ohio 45221

DESCRIPTION OF PROJECT

Award Date: Sept 1, 1967

Completion Date: Aug 31 1970

Project Cost: $28,461

Federal Cost: $26,099

Summary:

The cause of influence of foam coalescence and drainage in foam fractionation will be examined further, utilizing data obtained from a column equipped with a series of electrical conductivity cells for the measurement of local densities in the rising foam. The experimental results so obtained will be analyzed theoretically with particular regard for the effect of surface viscosity. The resulting influence on the separation of components attainable by foam fractionation will be then determined in a fundamental manner. In addition, the beneficial influence of vertically elongating the liquid pool at the bottom of the column will be examined further.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17030 DHZ
(14-12-852)

TITLE OF PROJECT: Evaluation of In-Depth Filtration for Waste Water Treatment using a Mobile Pilot Plant

GRANTEE OR CONTRACTOR:
Engineering-Science, Inc.
150 East Foothill Boulevard
Arcadia, California 91006

Project Site: Oakland, Calif.

EPA PROJECT OFFICER:

James F. Kreissl
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: Apr 13, 1970

Completion Date: Apr 13, 1972

Project Cost: $127,610

Federal Cost: $127,610

Summary:

This study is to develop design and operating criteria for in-depth filtration as applied to the treatment of various wastewaters for the purposes of clarification and/or phosphorus removal. Various coagulants modes of filter operation and degress of pretreatment will be evaluated to achieve different levels of product quality for activated sludge, trickling filter and primary effluents. A profile of application for in-depth filtration will be developed. A unique feature of the proposed research is development of an accurate process control technique.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17030 DKG

TITLE OF PROJECT: "Backwash of Granular Filters Used in Wastewater Filtration"

GRANTEE OR CONTRACTOR:

Engineering Research Institute
Iowa State University
Ames, Iowa 50010

Project Site: Ames, Iowa

EPA PROJECT OFFICER:

James Kreissl
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: Sept 1, 1971

Completion Date: (continuing)

Project Cost: $46,641 (1st Increment)

Federal Cost: $40,923 (1st Increment)

. Summary:

The project will involve studies of back washing single and dual media filters in order to develop backwashing procedures to give optimum filtration. The project proposes to answer four questions basic to backwashing of either of the filters:

1. What degree of expansion provides optimum cleaning of the media?
2. What degree of intermixing at the media interface provides best filtration and easiest backwashing?
3. Given the media characteristics, how can the degree of expansion and amount of intermixing be calculated?
4. Is an air scour helpful during backwashing?

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DLD

TITLE OF PROJECT: "Multilayer Filtration"

GRANTEE OR CONTRACTOR:

University College
Gower Street
London W.C.I., England

EPA PROJECT OFFICER:

John J. Convery
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: University College
London, England

DESCRIPTION OF PROJECT

Award Date: June 1, 1966

Project Cost: $16,049

Completion Date: Sept 30, 1969

Federal Cost: $16,049

Summary:

Modern filter theory has shown that present design granular filters used in water purification are inefficient. This is due to the configuration of the grains after upward flow washing which puts the finest grains at the top inlet face of the filter and coarsest at the bottom outlet. A more rational design would reverse this size gradation so that water containing particles in suspension enter the coarsest grains first, passing through subsequently finer and finer media. Such a configuration can only be maintained as hydraulically stable if the coarse grains are the least dense and the fine grains are the most dense. Such a density and size graded three layer filter of anthracite sand and garnet has already been operated experimentally with particulate suspensions, and the theory confirmed. It is proposed to extend this work to multiple layers, and to use flocculent suspensions which are more frequently encountered in practice.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DLX

TITLE OF PROJECT: "Orthokinetic Flocculation of Heterodispersed Systems"

GRANTEE OR CONTRACTOR:
The Regents of the University
of California
118 California Hall
Berkeley, California 94720

Project Site: Richmond, California

EPA PROJECT OFFICER:
Dr S. A. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 6, 1964

Completion Date: Oct 26, 1970

Project Cost: $156,732

Federal Cost: $148,850

Summary:

The specific objectives of this project are: (1) to determine the requirements for initial mixing in achieving high performance of precipitation-flocculation and disinfection processes, and (2) to establish a basis for optimizing the design of precipitation-flocculation-sedimentation systems for the chemical treatment of raw municipal wastewater.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17030 DMA

TITLE OF PROJECT: "Study of Upflow Filter for Tertiary Treatment"

GRANTEE OR CONTRACTOR:

Jefferson Parish, Louisiana
Department of Sanitation
Metairie, Louisiana 70005

EPA PROJECT OFFICER:

Sidney Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Camp Plauche Sewage Treatment Plant No. 2
Jefferson Parish, Louisiana

DESCRIPTION OF PROJECT

Award Date: June 1, 1970

Completion Date: Oct 1, 1972

Project Cost: $130,800

Federal Cost: $ 98,100

Summary:

The primary objective of this project is to evaluate the effectiveness of an upflow sand filter as a method of tertiary and secondary wastewater treatment. Treatment efficiencies of effluents from a high rate trickling filter plant, from the high rate filter without further clarification, and directly from the primary clarifier will be determined. Chemical flocculants and coagulants of various types and in varying amounts will be investigated so as to determine comparative benefits to filter operation, to establish optimum dosage, and to indicate cost of operation.

An upflow filter installation with a maximum capacity of 1.0 MGD will be installed at the existing Camp Plauche Sewage Treatment Plant No. 2. This is an existing high rate filter plant with a capacity of 3.75 MGD.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DMZ
WP-00960

TITLE OF PROJECT: "The Surface Shear Viscosity of Monomolecular Films"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Clarkson College of Technology Potsdam, New York 13676	W. A. Cawley Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Clarkson College
Potsdam, N. Y.

DESCRIPTION OF PROJECT

Award Date:	June 1, 1966	Project Cost:	$71,804
Completion Date:	Nov 15, 1969	Federal Cost:	$62,394

Summary:

A theoretical and experimental program has been initiated into the rheological behavior of fluid interfaces at which are adsorbed thin films of surface active substances. The eventual result of the investigation should be a measurement of the absolute surface shear viscosities of matter in the boundary state.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DNA

TITLE OF PROJECT: "Foam Separation Flotation of Colloid Organic Systems"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Kentucky Research Foundation Lexington, Kentucky	Dr. Carl Brunner Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Lexington, Kentucky

DESCRIPTION OF PROJECT

Award Date: Aug 1, 1967

Project Cost: $54,416

Completion Date: Dec 31, 1968

Federal Cost: $51,708

. Summary:

The overall objective of this investigation is the establishment of definite design criteria for specific, continuous foam separation processes. The processes will include foam fractionation-flotation of colloidal and soluble iron from water supplies, the ion flotation of hexavalent chromium form plating wastes, the foam fractionation of sulphate, sulphite, and lignin-containing waste from pulp and paper mills, and the ion flotation of free and complexed cyanide. The processes will be conducted on a continuous-flow basis. An economic evaluation will be carried out and definite recommendations on the applicability of each process will be made.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 DOV

TITLE OF PROJECT: "Flocculation of Colloids Suspended in Water"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Clarkson College of Technology Potsdam, New York 13676	Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Potsdam, New York

DESCRIPTION OF PROJECT

Award Date:	June 1, 1966	Project Cost:	$66,586
Completion Date:	June 31, 1969	Federal Cost:	$69,240

Summary:

This project is an expansion of the concentrated program which is being carried out at our laboratory with the primary aim to elucidate the flocculation effects of various polyelectrolytes and metal chelates on a variety of aqueous colloidal systems. In addition, it is proposed to develop a new family of cationic polymeric chelate flocculents which are expected to be extremely efficient in water purification and water renovation processes. It has been shown that the coagulation ability of a metal ion can be significantly enhanced by its chelation. Using properly chosen ligands the coagulation concentration could be reduced by more than four orders of magnitude. In our opinion, the incorporation of such chelate ions into polymer chains should result in flocculating agents which could be "tailored" for specific application. It is proposed to investigate a variety of colloidal systems such as clays, silver halides, silica and microcrystalline cellulose with regard to their stability towards polymeric chelates.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17030 DUW

TITLE OF PROJECT: "The Role of silica in Water Quality Control"

GRANTEE OR CONTRACTOR:

The University of Michigan
Ann Arbor, Michigan 48104

EPA PROJECT OFFICER:

Patrick Tobin , (EPA)
Office of Research and Monitoring
Municipal Technology Branch
Washington, D. C. 20460

Project Site: Ann Arbor, Michigan

DESCRIPTION OF PROJECT

Award Date: Sept 1, 1965

Project Cost: $117,632

Completion Date: May 31, 1972

Federal Cost: $115,480

Summary:

The broad objective of this project is to define the role of dissolved silica in water quality control, or more specifically the role of dissolved silica in determining the fate of metal ions in natural waters and in wastewaters. A major additional objective is a thorough examination of polymerization reactions of silica and the application of polymeric silicates for coagulation of municipal and industrial wastes. This terminal period is funded to analyze the most recent data and prepare a final report.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 EBE

TITLE OF PROJECT: "Chemical Aspects of Coagulation"

GRANTEE OR CONTRACTOR:

Harvard University
Cambridge, Massachusetts 02138

EPA PROJECT OFFICER:

Dr. Sidney A. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Cambrige, Massachusetts

DESCRIPTION OF PROJECT

Award Date: May 1, 1962

Project Cost: $102,144

Completion Date: Dec 31, 1968

Federal Cost: $102,144

Summary:

The principal aim of the project is to define more quantitatively the pertinent chemical factors (acid-base equilibria, complex formation, ion exchange, solubility equilibria) which may govern distabilization of naturally occuring colloids (organic color, clay, proteins, polyelectrolytes).

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17030 EBH

TITLE OF PROJECT: "Improved Liquid-Solids Separation by Use of an Aluminum Compound in Activated Sludge Treatment"

GRANTEE OR CONTRACTOR:
Greene County, Ohio
2605 Marden Drive
Dayton, Ohio 45432

EPA PROJECT OFFICER:
Edwin L. Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Greene County, Ohio

DESCRIPTION OF PROJECT

Award Date: June 1, 1969

Project Cost: $65,688

Completion Date: December 22, 1972

Federal Cost: $48,548

Summary:

The project objective is to demonstrate the increase in solids and phosphorus removal by the addition of sodium aluminate to the primary effluent at a small treatment facility. The study will concentrate on improving liquid-solids separation and sludge handling problems; phosphorus removal will be an incidental part of the study. A constant dose of 10 mg/l of aluminum will be used. The addition point of the aluminate will be varied and will be made at the head-end, half-way, and three-quarter point of the aeration chamber. The aluminate addition period would be for one year in order to cover all seasonal changes.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 ECA

TITLE OF PROJECT: "Filtration Kinetics in Water and Waste Water"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of California Berkeley, California	James Kreissl Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Berkeley, California

DESCRIPTION OF PROJECT

Award Date:	Aug 1, 1969	Project Cost:	$97,057
Completion Date:	Sept 3, 1971	Federal Cost:	$91,986

Summary:

To improve the design and operation of granular media filters based upon the development of an accurate description of filtration kinetics. This kinetic description of the filtration system will also lead to the development of new areas of application of granular media filtration in waste water treatment. This research is directed towards answering the two fundamental questions: (a) What is the best way to design filtration systems given a water or waste water of known quality and a desired effluent quality? (b) What is the best way to improve the efficiency of existing filtration systems?

These objectives will be achieved by investigating the physical and chemical factors which control filter performance through granular media for the removal of colloidal or flocculent particles within the size range of 5 to 50 microns. Development of a math model of particle deposition in porous media.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17030 ECM

TITLE OF PROJECT: "Waste Water Purification"

GRANTEE OR CONTRACTOR:

Lehigh University
Bethlehem, Penna. 18015

Project Site: Bethlehem, Penna.

EPA PROJECT OFFICER:

Dr. Robert B. Dean
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 9, 1969

Completion Date: June 30, 1971

Project Cost: $152,463

Federal Cost: $120,909

Summary:

The primary objective of this project is to investigate the mechanism which leads to an increase in sedimentation rate. The surface properties of a number of ash samples will be studied with respect to particle size, specific surface area, composition, solution adsorption to various surfactants, and the concentration and effect of water soluble ions present on the ash surface. A number of model surfaces will also be investigated in order to determine their effect on the sedimentation rate of activated sludges as a function of ionic concentration.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 EJB
WPRD 53-01-67

TITLE OF PROJECT: "Full-Scale Raw Waste Water Flocculation"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
District of Columbia, Washington, D. C.	D. F. Bishop Washington Pilot Plant 5000 Overlook Avenue, S. W. Washington, D. C. 20032

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date:	January 1, 1967	Project Cost:	$393,600
Completion Date:	January 1, 1968	Federal Cost:	$293,600

Summary:

Do determine and to optimize the improvement in solid capture in full-scale primary settlers produced by the addition of polyelectrolytes to the raw wastewaters.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17030 EOH
(14-12-423)
TITLE OF PROJECT: "Application of Hyperfiltration with Dynamically-Formed Membranes to Treatment of Municipal Sewage Effluents"

GRANTEE OR CONTRACTOR:

U. S. Atomic Energy Commission
P. O. Box E
Oak Ridge, Tennessee 37830

Project Site: Oak Ridge, Tennessee

EPA PROJECT OFFICER:
W. A. Schwartz
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: July 28, 1968

Completion Date: Nov 28, 1968

Project Cost: $113,000

Federal Cost: $113,000

Summary:

To determine the feasibility of using hyperfiltration with dynamically-formed membranes for removal of suspended solids, soluble organic materials, and inorganic materials form municipal wastewater. Primary and secondary effluents would be included in the study, but emphasis would be on treatment of secondary effluents.

Diatomaceous earth, polyelectrolytes, and the hydrousoxides of iron (III) and aluminum (III) would be the first choices if such substances are needed as filtered aids.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1703 ESX (14-12-176)

TITLE OF PROJECT: Proposal to Develop a High-Pressure-Foam Wastewater Treatment Process

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Garrett Research and Development Company, Inc. 1855 Carrion Road Laverne, California 91750	Dr. Sidney Hannah Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Laverne, California

DESCRIPTION OF PROJECT

Award Date: May 29, 1968

Project Cost: $31,874

Completion Date: May 31, 1969

Federal Cost: $31,874

Summary:

A pressure foaming process will be investigated for removal of soluble organics, suspended material, and certain inorganic materials. The use of pressures above atmospheric allows advantage to be taken of dissolved air flotation. Work would include dissolved air alone and a two-phase mixture of water containing dissolved air and air bubbles. Soluble organic and suspended solid removal can be obtained without use of additives. Inorganic removal will require use of flocculating chemicals.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17030 EYA (14-12-912)

TITLE OF PROJECT: An Experimental Study of Fluidized Sludge Blanket Clarification as Applied to Sewage Treatment

GRANTEE OR CONTRACTOR:
Research Triangle Institute
Research Triangle Park, N. C.
27709

EPA PROJECT OFFICER:
James F. Kreissl
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Chapel Hill Sewage Treatment Plant, North Carolina

DESCRIPTION OF PROJECT

Award Date: June 30, 1970
Project Cost: $81,168

Completion Date: October 30, 1971
Federal Cost: $81,168

Summary:

The objective of this project is to characterize the effectiveness of sludge blanket clarification for removal of suspended solids from raw sewage. Plan and carry out a statistically designed experimental program of clarifier process. Test a math model of blanket solids density variation with blanket depth for the purpose of improving the model formulation and usefulness. Attempt to measure the effective settling velocity of the blanket. The measurements will include, but will not be limited to a nuclear method.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 EZS

TITLE OF PROJECT: B.O.D., Suspended Solids, and Nutrient Removal

GRANTEE OR CONTRACTOR:

City of San Jose
San Jose, California

EPA PROJECT OFFICER:
Carl Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: San Jose, Calif.

DESCRIPTION OF PROJECT

Award Date: December, 1966

Project Cost: $53,870

Completion Date: January, 1971

Federal Cost: $36,100

Summary:

Originally this project was structured to evaluate from secondary effluent by foam filtration technique, but Bench Scale Cost Analysis indicated that such a process, while technically feasible, was very costly, about 47¢/1000 gallons.

The project was modified to include addition of phosphate-precipitating chemcials and flotation for floc removal. this treatment combination has a higher probability of being practicle than the originally proposed process.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1703 FBG (WP-00196)

TITLE OF PROJECT: Design Requirements for Municipal Diatomite Filters

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Iowa State University Ames, Iowa 50010	Mr. James Kreissl Robert A. Taft Water REsearch Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Iowa State University
Ames, Iowa 50010

DESCRIPTION OF PROJECT

Award Date: October 1, 1960 Project Cost: $150,000

Completion Date: January 1, 1970 Federal Cost: $143,800

Summary:

This study was undertaken to determine the characteristics of municipal applications in which diatomite filters may be used successfully, to study the effect of various variables on filtration economy and effectiveness, and to outline a procedure for designing a plant to operate with maximum economy. A theory of diatomite filtration has been proposed and verified for use in designing plants for the filtration of raw and chemically treated water. In the current work, a computer program is being developed that will be used for determining the characteristics of a filter to operate at least cost. A truck mounted diatomite water treatment plant is being operated in the field to gather design data for typical municipal water applications: iron removal, surface water filtration, coagulated water filtration, and filtration of lime-soda ash softened water. These data will be fed into a computer to determine the economics of filtering such waters with diatomite filters.

Laboratory studies are being made to determine the hydraulic characteristics of filter cakes used in the removal of kaolin, montmorillonite, and other clays from water. The evaluation of coagulant and polyelectrolyte coatings for filter aids will be extended to determine the effects of pH and other factors on their removal of biological organisms and turbidity and on their hydraulic characteristics.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17030 FEB (14-12-863)

TITLE OF PROJECT: A Fluidic Bubble Generator for Microflotation

GRANTEE OR CONTRACTOR:
Bowles Engineering Corp.
9347 Fraser Street
Silver Spring, Maryland 20910

EPA PROJECT OFFICER:
Mr. J. F. Kreissl
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Silver Spring, Maryland

DESCRIPTION OF PROJECT

Award Date: June 29, 1970

Project Cost: $49,803

Completion Date: February 10, 1972

Federal Cost: $49,803

Summary:

The purpose of this investigation is to develop a bubble-generation device for use in the flotation treatment of wastewaters which would eliminate the need dor costly pressurization equipment required with the dissolved air flotation process. The generator would produce bubbles having the same sizes and characteristics as bubbles normally obtained using pressurization techniques.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 1703 FKD (14-12-430)

TITLE OF PROJECT: Investigation of Amphipathic Water-Soluble Polymers as Flocculants and Flotation Aids in Domestic Wastewater Treatment

GRANTEE OR CONTRACTOR:
Standard Brands Chemical Industries, Inc.
P. O. Drawer K
Dover, Delaware 11901

EPA PROJECT OFFICER:
Dr. Sidney Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Dover, Delaware

DESCRIPTION OF PROJECT

Award Date: June 28, 1968

Completion Date: June 28, 1969

Project Cost: $99,712

Federal Cost: $99,712

Summary:

New, commercially feasible, synthetic polyelectrolytes or nonionic polymers with improved flocculation ability for suspended matter in domestic wastewater will be synthesized and tested. The incorporation of surface active groups in to the basic polymeric flocculant will be studied as a possible approach to enhancing the flocculating ability of polymers. Polymers will be analytically characterized as to composition, molecular weight, surface activity, charge type, density, and active group content for evaluation as flocculants and flotation aids in wastewater treatment.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 FQU

TITLE OF PROJECT: The Role of Polyelectrolytes in Filtration Processes

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
School of Public Health University of North Carolina Chapel Hill, North Carolina	Mr. Charles R. O'Melia Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Chapel Hill, North Carolina

DESCRIPTION OF PROJECT

Award Date: September 1, 1970 Project Cost: $27,171

Completion Date: August 31, 1971 Federal Cost: $25,102

Summary:

The objective of this project is to investigate destabilization of particulate matter and attachment of such solids to media during in-depth filtration. Basic mechansims and methods for dosage control of filter aids for application to water and wastewater treatment will be determined.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 FWH
(14-12-895)
TITLE OF PROJECT: "Experimental Investigation of a Continuous Filtration Process for Municipal Wastewaters"

GRANTEE OR CONTRACTOR:
Research Triangle Institute
Research Triangle Park
North Carolina 27709

EPA PROJECT OFFICER:
James F. Kreissl
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Research Triangle Park,
North Carolina

DESCRIPTION OF PROJECT

Award Date: Jun 24, 1970 Project Cost: $56,969

Completion Date: Jan 1, 1972 Federal Cost: $56,969

Summary:
The experimental work will be divided into two phases, the first being an investigation of the effects of operating variables on filter performance and the second being a study of the filter performance on various process streams. During the first phase, effects of filter medium particle size, throughout, and bed depth on solids removal and pressure drop will be studied. It is anticipated that particle sizes to be studied will range from about 0.75mm to about 2.0mm, throughputs from about two to about ten (higher , if feasible) GPM per sq. ft., and bed depths around four to ten ft. These studies will all be performed on unsettled trickling filter effluent, with routine measurements to include suspended solids removal, TOC and COD removal, pressure drop, throughput, particle size, bed depth, filter medium rate, and temperature. Occasional BOD removal and filter medium recovery efficiencies will also be determined. The second phase of experimental program will be to investigate the flexibility of the process in handling various plant streams. With operating variables set in the optimal range, the performance of the filter in processing raw sewage, primary clarifier effluent, and settled trickling filter effluent will be observed.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (CONTRACT)
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 GNO
(14-12-930)

TITLE OF PROJECT: "Development of Design Manual for Advanced Waste Treatment Processes - Suspended Solids Removal"

GRANTEE OR CONTRACTOR:
Burns & Roe, Inc.
700 Kinderkamack Road
Oradell, New Jersey

EPA PROJECT OFFICER:
Mr. W. H. Wechter
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Oradell, New Jersey

DESCRIPTION OF PROJECT

Award Date:	Aug 26, 1970	Project Cost:	$36,797
Completion Date:	Apr. 25, 1971	Federal Cost:	$36,797

Summary:

The purpose of the design manual is to provide the design engineer and regulatory agencies with up-to-date information on advanced waste treatment processes. Available information will be compiled in a form which can be readily utilized and detailed information will be included on process and equipment options, system design, and conceptual plans and specifications.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030 HMM

TITLE OF PROJECT: High Rate Deep Bed Filtration of an Activated Sludge Plant Effluent

GRANTEE OR CONTRACTOR:
Hydrotechnic, Inc.

EPA PROJECT OFFICER:
Jim Kreissl
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Cleveland, Ohio

DESCRIPTION OF PROJECT

Award Date: August 1, 1971

Project Cost: $80,799

Completion Date: April 10, 1972

Federal Cost: $76,759.00

Summary:

The project is oriented toward developing and demonstrating a procedure for the removal of suspended solids from settled raw sewage and to demonstrate a procedure for the removal of suspended solids and phosphate from the effluent of activated sludge operation by means of week-long runs of high rate deep bed filtration. The handling and disposal of backwash solids is included as part of the operation. The project work is also designed to diminish BOD values. Alum will be used as a coagulant and various polyelectrolytes will be used as flocculants.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: WPD 114-03-68

TITLE OF PROJECT: Tertiary Treatment by Flocculation and Rapid-Sand Filtration

GRANTEE OR CONTRACTOR:
City of Dayton
Department of Water
Room 309
Municipal Bldg.
Dayton, Ohio 45402
Project Site: Dayton, Ohio

EPA PROJECT OFFICER:
Dr. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: May 1, 1968

Project Cost: $24,494

Completion Date: May 1, 1970

Federal Cost: $21,000

Summary:

It is proposed to demonstrate on a semi-works basis the feasibility of tertiary by chemical coagulation, flocculation, sedimentation, and rapid-sand filtration at a large municipal trickling filter plant.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WPD 177-02-68

TITLE OF PROJECT: "Primary Treatment & Sludge Dewatering by Vibrating Screens"

GRANTEE OR CONTRACTOR:

Department of Public Works
Utilities Division, Rm 221
Courthouse Annex
814 Seventh Street, Sacramento, Calif.
Project Site: Sacramento, California

EPA PROJECT OFFICER:

Dr. Dean
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 1, 1967

Completion Date: June 1, 1969

Project Cost: $150,764

Federal Cost: $ 60,000

Summary:

To evaluate vibrating screens for primary treatment of domestic sewage.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WPRD-102-01-68

TITLE OF PROJECT: "The Use of Organic Polyelectrolytes for Operational Improvement of Waste Treatment"

GRANTEE OR CONTRACTOR:
City of Cleveland, Ohio
601 Lakeside Avenue
Cleveland, Ohio 44114

EPA PROJECT OFFICER:
Dr. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Easterly Plant, Cleveland

DESCRIPTION OF PROJECT

Award Date: Aug 31, 1967

Project Cost: $158,000

Completion Date: Aug 31, 1968

Federal Cost: $118,500

Summary:

The objectives are to determine the increased removal of BOD, COD suspended solids and nutrient compounds including nitrogen and phosphorus compounds in primary treatment and in the overall plant operation. The effects, if any, on sludge digestion, will be determined; general effects relating to sludge settling characteristics, viscosity, pumpability, and volume of solids produced will be determined.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WP-00588

TITLE OF PROJECT: "Ecology of Sphaerotilus in Activated Sludge"

GRANTEE OR CONTRACTOR:
Northwestern University
Evanston, Illinois

EPA PROJECT OFFICER:
C. W. Chambers
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Evanston, Illinois

DESCRIPTION OF PROJECT

Award Date:	Aug 8, 1965	Project Cost:	$103,500
Completion Date:	Aug 31, 1968	Federal Cost:	$ 96,866

Summary:

This project is a survey of activated sludge plants to determine (1) what types of filamentous organisms are present when the sludge has poor compaction characteristics, (2) the extent to which the compaction characteristics of the sludge depends upon the presence of filamentous organizms, and (3) environmental factors which encourage the growth of filamentous organisms in activated sludge. The research plan consists of collecting samples of sludge from a number of activated sludge plants; physical, chemical, and biological analyses of the sludge samples; and statistical analysis of the data to find correlations between the various parameters. Loss of sludge in the effluent due to poor compaction in the secondary settling tank or for other reasons is the most common operating problem with the activated sludge process and delineation of the factors which contribute to this conditions should result in significant improvements in process operation.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WP-00876
TITLE OF PROJECT: "Oxygen Utilization in Concentrated Microbial Systems"

GRANTEE OR CONTRACTOR:
Rensselaer Polytechnic Inst.
Troy, New York 12181

EPA PROJECT OFFICER:
R. C. Brenner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Troy, New York

DESCRIPTION OF PROJECT

Award Date: Sept 1, 1965 Project Cost: $85,560

Completion Date: Sept 1, 1968 Federal Cost: $95,000

Summary:

This project has at its immediate aim, the development of mathematical models to express the oxygen transfer, oxygen utilization for concentrated mixed microbial cultures. A major effort is being made to evaluate the coefficients appropriate for the models. The investigation involves the study of cultures ranging from 15 gm/l to 50 gm/l suspended volatile solids.

The long range objective of the research is to develop a biological process for the direct treatment of concentrated industrial waste which are susceptible to biological degradation. Synthetic wastes (45% dextrose; 45% non-fat milk, 10% yeast extract) in concentrations up to 30 gm/l COD have been treated by this process with over 99% COD removal.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WP-01021

TITLE OF PROJECT: "Effects of Surfactants on Fibrous Bed Coalescing"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Illinois Institute of Technology Chicago, Illinois 60616	Dr. Hannah Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date:	August 28, 1966	Project Cost:	$64,000
Completion Date:	August 3, 1967	Federal Cost:	$57,532

Summary:

The efficacy of close-packed beds of a mixture of fibers of cotton and a supporting material has been demonstrated and the results published (Sareen, et. al., A. I. Ch. E. Journal, 12, 1045 (1966)). The effects of Surface Active agents were shown to be unpredictable by ordinary criteria. In the current work, it is proposed to characterize the various types of SA agents as to solubility, hydrolysis, polarity, ionic condition, etc., in such a way that their effect on coalescence of oil droplets in an aqueous liquid field can be predicted. The use of an emulsion "break-time" test seems to be the best criterior to date. Surface phenomena are of paramount importance and the manner in which SA agents produce such interfacial conditions is a prime subject of this inquiry. The relation between these factors and coalescence is a final objective.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WP-01068-02
TITLE OF PROJECT: "Preparation of Monodisperse Emulsions"

GRANTEE OR CONTRACTOR:
University of California
Berkeley, California 94720

EPA PROJECT OFFICER:
Dr. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: University of California
Berkeley, California

DESCRIPTION OF PROJECT

Award Date: August 14, 1967
Project Cost: $68,000

Completion Date: August 31, 1969
Federal Cost: $61,000

Summary:

The research program has as its principal objective the development of a technique for the preparation of monodisperse emulsions of controlled drop size. The method we wish to exploit is the precipitation of drops from a supersaturated solution of three components onto already existing nuclei. We plan to study the kinetics of nucleation and the size distribution of drops which are formed for several different ways of producing the supersaturation. The results should be of use in many fields of emulsion research as, for example, in the testing of equipment for breaking liquid-liquid emulsions.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17030
WP-01268
TITLE OF PROJECT: "Use of Coagulation in the Flotation of Wastewater"

GRANTEE OR CONTRACTOR:
Illinois Institute of Tech.
Chicago, Illinois 60616

EPA PROJECT OFFICER:
Dr. Hannah
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Illinois Institute of Tech.
Chicago, Illinois 60616

DESCRIPTION OF PROJECT

Award Date: Sept 25, 1967
Project Cost: $80,500

Completion Date: August 31, 1970
Federal Cost: $72,388

Summary:

The process of gross flotation would be more widely used to the benefit of the nation's waterways if some of the present operating difficulties were better understood and could be removed, and if the operating efficiency of the process could be improved. The use of chemical coagulation in conjunction with gross flotation is an obvious means for improvement. Some waste treatment facilities have successfully employed this technique; other attempts have failed completely. Recycle ration is undoubtedly a significant variable; zero recycle gives the maximum yield of bubbles and the opportunity for nucleation on the dispersed particles, but damages or destroys the coagulant floc by the necessity of passing it through a pump and other constrictions. Increasing recycle reatios can eliminate the latter problem, and may still produce an adequate bubble yield. Nucleation, however, is an essential and little understood aspect. The hypotheses of time lag in nucleation and of a possible very significant distinction between nucleation in homogeneous and heterogeneous fluid media are to be investigated in this project.

DISSOLVED INORGANICS REMOVAL

9. A

DISSOLVED INORGANICS REMOVAL

Dissolved inorganics represent a part of municipal pollution which are not removed or reduced by conventional biological processes. A significant rise in dissolved inorganics can be expected during normal use of domestic water. At locations where wastewater reuse is being contemplated, their reduction or removal is essential to meet water quality standards.

The rising salinity of many water supplies and the increased cost in obtaining alternate water sources of higher quality add impetus for seeking processes that will effectively reduce the dissolved inorganics.

Among the processes that can be considered for reducing dissolved inorganics, reverse osmosis comes to the forefront because of its ability to reduce both dissolved inorganics and organics. Ion exchange, distillation and electrodialysis are other processes that are applicable for lowering the dissolved inorganics. However, each of these processes yield a brine solution that may require additional processing before disposal.

PROJECT INDEX

PPB 17040 - Dissolved Inorganics Removal

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DFC	Uniroyal, Inc.	A	9-7
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DSR	Eastern Municipal Water District Hemet, California	B	9-10
EEE	Culligan, Inc.	A	9-11
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14-12-181	Gulf General Atomic, Inc.	A	9-22

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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FINAL REPORTS AVAILABLE

PPB 17040 - Dissolved Inorganics Removal

Report Number	Title/Author	Source
17040DFC10/70	Feasibility Study of Regenerative Fibers For Water Pollution Control; Uniroyal Inc., Wayne, New Jersey	GPO - $ .75
17040DNM02/71	Feasibility of Treating Wastewater by Distillation, University of Florida, Gainesville, Florida	GPO - $ 1.00
17040EEE12/71	Wastewater Demineralization by Ion Exchange; Culligan International Co. Northbrook, Illinois	GPO - $ 1.25
17040EFD06/70	Membrane Materials for Wastewater Reclamation by Reverse Osmosis, Gulf General Atomic, San Diego, Cal.	GPO - $ .65
17040EFQ12/69	Reverse Osmosis Renovation of Municipal Wastewater, Aerojet-General Corporation El Monte, California	GPO - $ 1.50
17040EFQ02/71	Reverse Osmosis Renovation of Primary Sewage, Aerojet-General Corporation, El Monte, California	GPO $ .65
17040EUE	Amenability of Reverse Osmosis Concentrate to Activated Sludge Treatment; Rex Chainbelt, Inc., Milwaukee, Wisconsin	GPO - $ 1.25
17040EUN02/71	Demineralization of Wastewater by the Transport-Depletion Process, Southern Research Institute, Birmingham, Alabama	GPO - $ .65
17040---05/70	Study and Experiments in Waste Water Reclamation by Reverse Osmosis; Gulf General Atomic, Inc., San Diego, Cal.	GPO - $ 1.25

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 DFC
(14-12-815)

TITLE OF PROJECT: "Feasibility Study of Regenerative Fibers for Water Pollution Control"

GRANTEE OR CONTRACTOR:

Uniroyal, Inc.
Research Center
Wayne, New Jersey 07470

Project Site: Wayne, New Jersey

EPA PROJECT OFFICER:

Mr. R. A. Dobbs
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: October 17, 1969

Completion Date: October 31, 1970

Project Cost: $57,851

Federal Cost: $57,851

Summary:

The purpose of the investigation is to determine the feasibility of using polymers, melt-blended with a synthetic fiber carrier, for the sorption of inorganic pollutants from wastewater. The research will include the following phases: (1) selection of sorbents to be used, (2) co-spinning the promising sorbents from fiber-forming polymers, (3) evaluation of removal rate and capacity, and (4) determination of the regeneration characteristics.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 DMK (14-12-489)

TITLE OF PROJECT: "Evaluation and Characterization of Low-Pressure Membrane Ultrafiltration as a Technique for Removal and Identification of Macrosolutes and Microsolutes Present in Sewage and Sewage-Treatment-Process Effluents"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Amicon Corporation 25 Hartwell Avenue Lexington, Massachusetts 02173	J. M. Cohen Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Lexington, Massachusetts

DESCRIPTION OF PROJECT

Award Date: January 24, 1969 Project Cost: $77,200

Completion Date: October 31, 1969 Federal Cost: $77,200

Summary:

This project will determine the practicality of removing dissolved organics and inorganics from selected wastewater streams using membrane ultrafiltration. In addition to providing basic information towards selection of the most suitable membrane for the renovation of wastewaters, this study will provide a valuable new analytical tool and procedure for characterizing wastewater constituents.

The objectives of the study here proposed are (1) to subject representative sewage and wastewater streams to sequential ultrafiltration through a graded series of membranes, and determine the fractional removal of total dissolved organic and inorganic solutes accomplished by each member of the series (measuring concurrently the dependence of the membrane-type), and (2) to attempt to analyze by established chemical and instrumental techniques the components of each solute-fraction retained by each membrane in the series.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 DNM
(14-12-571)
TITLE OF PROJECT: "Feasibility of Treating Wastewater by Distillation"

GRANTEE OR CONTRACTOR:

University of Florida
College of Engineering
Gainesville, Florida 32601

EPA PROJECT OFFICER:
Dr. C. A. Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Gainesville, Florida

DESCRIPTION OF PROJECT

Award Date: June 26, 1969

Completion Date: September 30, 1970

Project Cost: $54,865

Federal Cost: $54,865

Summary:

The technical feasibility of evaporation of municipal sewage treatment plant effluent for the purpose of water reuse was investigated. The equipment used was a three-effect long tube vertical (LTV) evaporator. The objectives of the research were to determine the effects of feedwater quality, and evaporation conditions on product water quality, post evaporation polishing, and evaporator tube scaling. Feedwaters tested in the evaporator included extended aeration effluent, high rate trickling filter effluent, and contact stabilization effluent. All feedwater was acidified and vacuum degassed.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 DSR

TITLE OF PROJECT: "Reverse Osmosis of Treated & Untreated Secondary Sewage Effluent Granular

GRANTEE OR CONTRACTOR:
Eastern Municipal Water District
P. O. Box 858
Hemet, California 92343

EPA PROJECT OFFICER:
Gerald Stern
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Hemet, California

DESCRIPTION OF PROJECT

Award Date: Dec 1966

Project Cost: $424,300

Completion Date: June 30, 1972

Federal Cost: $318,300

Summary:

The objective of this project is to demonstrate the use of reverse osmosis in reducing the concentrations of total disolved solids in sewage treatment plant effluents which are used in a ground water recharge program in order to maintain satisfactory concentration levels of salts and refractories in ground water despite continuous recycling. Further, to determine the comparative efficiencies and costs of reverse osmosis and to demonstrate the reverse osmosis unit as an integral and useful element in the total system of water reclamation and reuse required because of the arid area's water shortage.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (CONTRACT) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 EEE
(14-12-599)
TITLE OF PROJECT: "Wastewater Demineralization by Ion Exchange"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Culligan, Incorporated Industrial Systems Division 440 South McLean Elgin, Illinois 60121	Mr. R. A. Dobbs, Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Elgin, Illinois	

DESCRIPTION OF PROJECT

Award Date: Sept. 10, 1969	Project Cost: $189,373
Completion Date: Mar. 31, 1971	Federal Cost: $189,373

Summary:

The first objective of this project is to construct a highly flexible, pilot-scale ion exchange system that can be used for demineralization of municipal secondary effluent at rates up to 10 gpm. The second objective is to operate the pilot plant over a range of variables to obtain performance data that can be used to estimate the cost of ion exchange for various types of pretreatment.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 EFO
(14-12-452)
TITLE OF PROJECT: "Membrane Materials for Waste Water Reclamation by Reverse Osmosis"

GRANTEE OR CONTRACTOR:
Gulf General Atomic
P. O. Box 608
San Diego, California 92112

EPA PROJECT OFFICER:
Dr. C. A. Brunner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: San Diego, Calif.

DESCRIPTION OF PROJECT

Award Date: June 11, 1969
Project Cost: $79,982

Completion Date: June 30, 1970
Federal Cost: $79,982

Summary:

An experimental program was carried out to evaluate potential reverse osmosis membranes for the tertiary treatment of secondary sewage effluent. The evaluation program consisted of both direct osmosis and reverse osmosis tests on various membranes using both single solutes and secondary effluent. The types of membranes tested were polyurethane latices, cellulose diacetate, cellulose 2.5 acetate, polyvinylpyrrolidone (PVP)-polyisocyanate interpolymers, and polyelectrolytes.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 EFQ
(14-12-184
TITLE OF PROJECT: "Reverse Osmosis Renovation of Municipal Wastewater"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Aerojet-General Corporation 9200 East Flair Drive El Monte, California 91734	Gerald Stern Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: El Monte, California

DESCRIPTION OF PROJECT

Award Date:	June 20, 1968	Project Cost:	$253,700
Completion Date:	Sept. 30, 1969	Federal Cost:	$253,700

Summary:

Laboratory-scale investigations will be performed to enhance and extend existing knowledge of the reverse osmosis process to determine operating parameters and relations required for system evaluation and optimization. Laboratory-scale studies shall be performed using several grades of municipal wastewater which represent a broad spectrum of effluent qualities. Flat membrane test cells will be utilized.

The laboratory-scale studies shall consist of three separate series of tests designed to elucidate and quantify for the reverse osmosis process the general performance, the effect of suspended solids on performance, and membrane degradation by suspect compounds. A mathematic model will be developed to express the effect of the above variable on process performance.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 EFQ
(14-12-885)

TITLE OF PROJECT: "Reverse Osmosis Renovation of Primary Sewage"

GRANTEE OR CONTRACTOR:

Aerojet-General Corporation
9200 East Flair Drive
El Monte, California 91734

Project Site: El Monte, California

EPA PROJECT OFFICER:

Gerald Stern
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: May 27, 1970

Completion Date: Nov. 30, 1970

Project Cost: $96,600

Federal Cost: $96,600

Summary:

The objective of this contract extension is to determine what types of pretreatment or cleaning procedures can be used to prevent flux decline when treating primary effluent by reverse osmosis.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 EOR
(14-12-831)
TITLE OF PROJECT: "Water Renovation of Municipal Effluents by Reverse Osmosis"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Gulf Environmental System Co. Box 608 San Diego, California 92112	John M. Smith Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: San Diego and Pomona, California

DESCRIPTION OF PROJECT

Award Date:	Jan 23, 1970	Project Cost:	$173,490
Completion Date:	July 31, 1971	Federal Cost:	$173,490

Summary:

Objectives of this study are to determine in detail those factors causing organic fouling of reverse osmosis membranes and to evaluate and optimize methods of controlling these fouling phenomena. Major efforts will be directed toward evaluating the use of enzymes and enzyme-related systems as cleaning agents. Bench scale and pilot plant scale investigations by the contractor have shown that membrane cleaning procedures using enzymes are the most promising methods of controlling this fouling. The investigation of the fouling mechanism and optimization of related control techniques increase the feasibility of this process.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 EUE

TITLE OF PROJECT: "Amenability of Reverse Osmosis Concentrate to Activated Sludge Treatment"

GRANTEE OR CONTRACTOR:

Rex Chainbelt Inc. Technical Center
P. O. Box 2022
Milwaukee, Wisconsin 53201

Project Site: Milwaukee, Wisconsin

EPA PROJECT OFFICER:

Gerald Stern
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: May 12, 1970

Project Cost: $23,903

Completion Date: May 31, 1971

Federal Cost: $22,708

Summary:

The objective of the project was to establish, through a laboratory scale study, the feasibility of utilizing reverse osmosis (R-O) as a means of concentrating domestic sewage for subsequent treatment by the activated sludge process. It is anticipated that successful completion of this objective will make possible a substantial reduction in the size of the equipment normally required for treatment of such flows, therefore reducing both capital and operating costs. In addition, the R-O process will produce a product water stream which, following disinfection, may be returned directly to municipal drinking water supplies.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 EUN
(14-12-812)

TITLE OF PROJECT: "Demineralization of Wastewater by the Transport-Depletion Process"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Southern Research Institute 2000 9th Avenue S. Birmingham, Alabama 35205	Dr. C. A. Brunner Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Jefferson County, Ala.

DESCRIPTION OF PROJECT

Award Date: June 29, 1968	Project Cost: $91,900
Completion Date: Jan 31, 1971	Federal Cost: $91,900

Summary:

The transport-depletion process was investigated for demineralizing municipal secondary effluent. The major problem encountered were fouling & scaling of the membrane. Use of an anion-selective membrane with periodic flushing with sodium chloride solution controlled the fouling problem during a 500 hour operation. A cost estimate for a 10 mgd plant is included in the report.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 (CONTRACT) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 FEE
(14-12-926)

TITLE OF PROJECT: "Hollow Fiber Technology for Advanced Waste Treatment"

GRANTEE OR CONTRACTOR:
Monsanto Research Corporation
Dayton Laboratory
Dayton, Ohio 45407

EPA PROJECT OFFICER:
John M. Smith
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Dayton, Ohio

DESCRIPTION OF PROJECT

Award Date: Oct. 15, 1970

Completion Date: Oct. 14, 1971

Project Cost: $99,057

Federal Cost: $99,057

. Summary:

The purpose of this investigation is to develop the technology required to fabricate practical reverse osmosis modules for wastewater renovation using newly developed solution-spun cellulose acetate hollow fibers. Emphasis will be placed on improving fiber performance and in optimizing module design to minimize and control organic fouling that is characteristic of wastewaters.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040 FKG
(14-12-444)

TITLE OF PROJECT: "Reclamation of Biologically, Mechanically and Chemically Treated Wastewater for Potable Water Supply Uses Employing Carbon Adsorption, Electrodialysis and Chlorination Treatment

GRANTEE OR CONTRACTOR:
Santee County Water District
P. O. Box 70
Santee, California 92071

EPA PROJECT OFFICER:
Gerald Stern
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Santee California

DESCRIPTION OF PROJECT

Award Date: June 29, 1968
Project Cost: $186,200

Completion Date: June 30, 1971
Federal Cost: $186,200

Summary:

The objective of this project is to obtain necessary process and economic information to determine whether carbon adsorption followed by electrodialysis demineralization and chlorination will produce water equal to or better than the raw drinking water supplied to the population at Santee. Results obtained by this sequence of processes will be compared to results from a parallel system employing carbon adsorption, ion exchange and chlorination.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 (WP-00713-03)

TITLE OF PROJECT: Concentration of Chemicals by Floc Forming Organisms

GRANTEE OR CONTRACTOR:
Ohio State University
Research Foundation
Columbus, Ohio 43212

EPA PROJECT OFFICER:
F. L. Evans
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Columbus, Ohio

DESCRIPTION OF PROJECT

Award Date: September 11, 1967 **Project Cost:** $70,042

Completion Date: September 30, 1969 **Federal Cost:** $24,657

Summary:

To investigate the metabolic activities of floc forming organisms with regard to their ability to lower biochemical oxygen demand (BOD) and to remove toxic metal ions from solution in relation to aerobic waste treatment processes. This may have particular relevance to specialized waste treatment situations such as those encountered in milk processing wastes and metal processing wastes. It is planned to examine the relative importance of the floc matrix (Zoogleal material), compared to the same microbial cells not in zoological form, to the aerobic treatment process. The influence of environmental variables in the floc forming process is also being studied.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17040 (WP-01235-01)

TITLE OF PROJECT: Removal of Metal Ions by Flotation with Surfactants

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Missouri at Rolla Rolla, Missouri 65401	Mr. James Kreissl Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: University of Missouri
Rolla, Missouri 65401

DESCRIPTION OF PROJECT

Award Date: September 25, 1967 **Project Cost:** $74,206

Completion Date: September 30, 1969 **Federal Cost:** $32,946

Summary:

The study was a fundamental investigation of the method called ion flotation which utilizes solutions of surface active agents or surfactants and which has potential as an economical treatment procedure. The objectives of the work were to make ion flotation studies on ions not previously investigated. The studies attempt to determine what type of surfactant is most effective and what conditions of pH, surfactant concentration, and temperature are necessary for the method to be effective. An additional objective will be to study the effects of addition or surfactant on the state of solution and availability for flotation of the metal ions. These studies are to be correlated with the flotation studies as an aid to understanding the results obtained there.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17040
(14-12-181)

TITLE OF PROJECT: "Study and Experiments in Waste Water Reclamation by a Reverse Osmosis Process"

GRANTEE OR CONTRACTOR:
Gulf General Atomic, Inc.
P. O. Box 608
San Diego, California 92112

EPA PROJECT OFFICER:
A. N. Masse
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: San Diego, Calif.

DESCRIPTION OF PROJECT

Award Date: June 29, 1968

Project Cost: $112,410

Completion Date: May 31, 1970

Federal Cost: $112,410

Summary:

This work investigated at the pilot plant scale, the feasibility of using reverse osmosis to treat various wastewater streams. Specific objectives were to determine the required degree of pretreatment, to establish membrane lifetime, and to describe the time dependent flux decline characteristics and solute rejection performance of the membranes as a function of feed stream quality.

DISSOLVED BIODEGRADABLE ORGANICS REMOVAL

10-A

DISSOLVED BIODEGRADABLE ORGANICS REMOVAL

The areas of concern in this sub-program encompass most of the functions of biological and biological chemical wastewater treatment processes. Because the efficiency of biological treatment is so intimately related to solids removal and to the return of supernatant from sludge handling processes, this sub-program interfaces with 17030 and 17070. Removal of biodegradable organics from wastewater treatment plant effluent is essential in reducing the burden of the pollution load resulting from the presence of oxygen-consuming organics in the receiving waters. Methods must be developed and demonstrated to provide for upgrading existing plants, optimizing operations and new more effective and economical treatment.

Independent physical-chemical treatment systems, rotating biological contactor units, and pure oxygen as a replacement for air in secondary treatment are examples of new techniques under advanced stages of evaluation for possible application to the design of new plants or to upgrading existing plants. Methods for upgrading the operation of trickling filters or for conversion of trickling filters to activated sludge operation are under study.

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DBI	The Pennsylvania State University	C	10-11
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14-12-151	Burns and Roe, Inc.	E	10-55

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

FINAL REPORTS AVAILABLE

PPB 17050 - Dissolved Biodegradable Organics Removal

Report Number	Title/Author	Source
17050---10/69	Photolysis Mechanisms for Pollution Abatement; by IIT Research Institute	NTIS-PB 190 169
17050---00/70	Characteristics and Kinetics of Biological Fixed Film Reactors; by Clemson Univ., Clemson, SC	NTIS-PB 199 834
17050---07/68	Evaluation of Waste Treatment System Chemawa Indian School; by B. David Clark and Kenneth A. Dostal, Pacific Northwest Water Lab., FWPCA, Corvallia, Oregon	**
17050DAL05/70	Granular Carbon Treatment of Raw Sewage; by FMC Corporation	GPO - $1.00
17050DAM05/69	Municipal Sewage Treatment with a Rotating Biological Contactor; by Allis-Chalmers Research Div., Milwaukee, Wisc.	NTIS-PB 201 701
17050DAM11/71	Application of Rotating Disc Process to Municipal Wastewater Treatment; by Autotrol Corporation, Bio-Systems Div., Milwaukee, Wisconsin	GPO - $ .75
17050DJS05/71	Oxygen Consumption in Continuous Biological Culture; by Center for Research, Inc., Univ. of Kansas, Lawrence, Kansas	GPO - $1.25
17050DNW05/70	Investigation of the Use of High-Purity Oxygen Aeration in the Conventional Activated Sludge Process; by Union Carbide Corp., Linde Div. Tonawanda, N.Y.	NTIS-PB 194 241

Report Number	Title/Author	Source
17050DNW02/72	Continued Evaluation of Oxygen Use in Conventional Activated Sludge Processing; by Union Carbide Corp., Linde Division, Tonawanda, N.Y.	GPO - $1.50
17050DV009/71	Water Budget for the City of Laramie, Wyoming; by Paul A. Rechard, Water Resources Research Insti., Univ. of Wyoming, Laramie, WY	GPO - $ .50
17050DV010/71	Supplementary Aeration of Lagoons in Rigorous Climate Areas; by Robt. L. Champlin, Dept. of Civil Engr., Univ. of Wyoming, Laramie, Wyoming	GPO - $ .75
17050EE003/71	Integrated Activated Sludge Biological Filter Process; by City of San Buenaventura, Cal.	**
17050EJB11/70	Full-Scale Raw Wastewater Flocculation with Polymers; by D. C. Dept. Sanitary Engineering, Washington, D. C.	(Under Review)
17050EVF02/71	Automatic Control of an Activated Sludge Reactor; by Univ. of Connecticut, Storrs, Connecticut	**
17050FIM05/70	Optimizing Lipid Biostabilization; by Midwest Research Institute, Kansas City, Mo.	GPO - $ .60

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DAL
(14-12-459)

TITLE OF PROJECT: "Treatment of Raw Sewage and Primary Effluent in an Expanded Bed of Activated Carbon"

GRANTEE OR CONTRACTOR:

FMC Corporation
Chemical Research and Development Center
Princeton, New Jersey 08540

Project Site: Princeton, New Jersey

EPA PROJECT OFFICER:

Dr. Carl A. Brunner
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: October 15, 1968 Project Cost: $89,500

Completion Date: January 15, 1970 Federal Cost: $89,500

Summary:

The overall objective of this contract is to determine the feasibility of removing organic materials from primary effluent, or raw sewage clarified in some other way, using granular activated carbon in an upflow expanded bed. The work will include:

(1) Obtaining of sufficient engineering data on a pilot scale for the expanded-bed contacting systems to estimate the cost of the process.
(2) Comparing of results from the expanded-bed system and a fixed-bed system.
(3) Obtaining of data on the effect of pretreatments and post-treatments for improved removal of suspended solids.
(4) Determining the need for aeration in the carbon-bed systems to prevent septicity and to remove biological materials from the carbon particles.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a(1) Contract, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 DAM (14-12-24)

TITLE OF PROJECT: "Design, Construction, Operation and Evaluation of a Demonstration Waste Treatment Device Termed the Rotating Biological Contactor"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Autotrol Corporation Bio-Systems Division 5855 North Glen Park Road Milwaukee, Wisconsin 53209	Mr. Darwin Wright Environmental Protection Agency Office of Research and Monitoring Washington, D. C. 20460

Project Site: Milwaukee, Wisconsin

DESCRIPTION OF PROJECT

Award Date: September 28, 1967 Project Cost: $455,352

Completion Date: January 30, 1972 Federal Cost: $388,526

51,826 (2/69)

Summary: 15,000 (12/71)

$455,352

This project demonstrated the applicability of a "rotating biological contactor", a new concept of biological treatment for treating combined sewer overflows. The method uses power-driven rotating discs as the "housing media" for biological growths. Previous laboratory studies indicated detention times can be greatly shortened as compared to conventional methods. Therefore, this technique offers a potential for biological treatment of flows greater than dry weather magnitudes, an important factor in treating combined sewer overflows. Final Report is pending.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DAM
(14-12-24)

TITLE OF PROJECT: "Rotating Biological Contactor to Municipal Sewage Treatment"

GRANTEE OR CONTRACTOR:

Allis Chalmers Manufacturing Co.
Box 512
Milwaukee, Wisconsin

Project Site: Milwaukee, Wisconsin

EPA PROJECT OFFICER:

Robert L. Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: August 1, 1968
Project Cost: $51,826

Completion Date: February 15, 1969
Federal Cost: $51,826

Summary:
To demonstrate the feasibility of treating municipal sewage using a pilot plant consisting of rotating biological disks,

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (CONTRACT) , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DAM
(14-12-810)

TITLE OF PROJECT: "Application of Rotating Biological Contactor to Municipal Sewage Treatment"

GRANTEE OR CONTRACTOR:
Allis Chalmers
Research Division
Box 512
Milwaukee, Wisconsin 53201

EPA PROJECT OFFICER:
Robert L. Bunch
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Pewaukee, Wisconsin

DESCRIPTION OF PROJECT

Award Date:	October 3, 1969	Project Cost:	$33,375
Completion Date:	October 1, 1972	Federal Cost:	$33,375

Summary:

The objective of this contract is to further study the performance of the rotating biological contactor pilot plant under actual municipal wastes conditions. These variables will be investigated: hydraulic loading, sludge recycle, and sludge production. Allis-Chalmers will test a two stage 1.75 meter diameter RBC unit at the waste water treatment plant at Pewaukee, Wisconsin. This program will allow comparison of existing data obtained from a 10-stage unit at Milwaukee and the collection of new data which would be applicable to the proposed RBC plant that is to be built at Pewaukee.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DBI

TITLE OF PROJECT: "Bacterial Zoogloea Formation"

GRANTEE OR CONTRACTOR:

The Pennsylvania State University
Old Main Building
University Park, Pennsylvania 16802

Project Site:

EPA PROJECT OFFICER:

Cecil W. Chambers
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: July 25, 1969 Project Cost: $30,203

Completion Date: December 1, 1972 Federal Cost: $28,693

Summary:

The overall objective of this project is to determine the kinds of bacteria that can form zoogloeal masses; observe the morphology of the structures formed; establish the physiological characteristics of the bacteria obtained; demonstrate the manner in which zoogloeal structures attain characteristic shapes; and use of time-lapse cinematography to photograph the sequence of events that occur during the development of zoogloeal clusters.

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DCC

TITLE OF PROJECT: "Pilot Plant Demonstration of a Lime-Biological Treatment Phosphorus Removal System"

GRANTEE OR CONTRACTOR:

Kansas State University
Department of Civil Engineering
Manhattan, Kansas 66502

Project Site: Manhattan, Kansas

EPA PROJECT OFFICER:

Edwin L. Barth
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 10, 1969

Completion Date: May 31, 1971

Project Cost: $51,231

Federal Cost: $42,585

Summary:

The primary objective of this investigation is to develop design and operating criteria for the recently developed phosphate removal method of lime precipitation prior to biological treatment. Sludge production and sludge characteristics, both chemical and biological will be defined. Different methods of sludge disposal will be investigated.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DCU (14-12-464)

TITLE OF PROJECT: Improved Engineering Application of the Two-Film Theory to Oxygen Transfer

GRANTEE OR CONTRACTOR:

Roy F. Weston
1426 Lewis Lane
West Chester, Penna. 19380

EPA PROJECT OFFICER:

J. B. Farrell
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: West Chester, Penna.

DESCRIPTION OF PROJECT

Award Date: October 30, 1968

Completion Date: June 30, 1971

Project Cost: $46,000

Federal Cost: $46,000

Summary:

The objective of this project is to provide information and engineering data on the two-film theory to oxygen transfer (effects of water film temperature and carbon dioxide diffusion) that will permit more efficient and reliable design of aeration systems which utilize entrainment-aeration devices. This work will also be useful in predicting more accurately the rate of oxygen transfer to natural waters depleted in oxygen.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DDY (14-12-474)

TITLE OF PROJECT: A Literature Search and Critical Analysis of Biological Trickling Filter Studies

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
DOW Chemical Company Midland, Michigan 48680	Robert L. Bunch Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Midland, Michigan

DESCRIPTION OF PROJECT

Award Date: January 1, 1969	**Project Cost:** $19,039
Completion Date: March 31, 1972	**Federal Cost:** $19,039

. Summary:

The proposal is to prepare a comprehensive review and critique of the international literature of biological trickling filters.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 DFJ

TITLE OF PROJECT: Concentration of Chemicals by Floc-Forming Organisms"

GRANTEE OR CONTRACTOR:
The Ohio State University
Research Foundation
1314 Kinnear Road
Columbus, Ohio 43212

EPA PROJECT OFFICER:
Cecil W. Chambers
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Columbus, Ohio

DESCRIPTION OF PROJECT

Award Date:	September 25, 1968	Project Cost:	$64,282
Completion Date:	August 31, 1970	Federal Cost:	$58,194

Summary:

The total project has the objective of examining the role of floc-forming organisms as biological agents responsible for removal of BOD and toxic chemicals (metal ions, etc.) from water.

Bacterial flocculation is a process which is essential to successful aerobic biological waste treatment processes. The total project has had the objectives of examining the role of floc-forming bacteria in: (a) the process of flocculation; (b) the means by which these organisms exert a high rate of BOD removal; (c) the mechanisms by which the bacteria either oxide chemicals in solution or otherwise remove them via complexing or absorption reactions; (d) determining the role of exocellular or zoogloeal matrix of a particular type of floc-former (Zoogloea ramigera) in reaction to a, b, and c above.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DFL

TITLE OF PROJECT: Adaptation by Microbial Population

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Cornell University Ithaca, New York 14850	Cecil Chambers Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Ithaca, New York

DESCRIPTION OF PROJECT

Award Date: August 29, 1967	**Project Cost:** $63,540
Completion Date: August 31, 1969	**Federal Cost:** $46,292

Summary:

Selected experiments on enzyme adaptation and repression have been made with pure cultures and mixed populations of microorganisms derived from activated sludge for the purpose of determining the physiological and nutritional homogeneity or heterogeneity of the populations transforming aromatic materials and other carbonaceous substrates. The analyses of the populations have been made previously by enumeration and replica-plating on a series of substrates present and to reveal shifts in the microbial population when they occur. Similar analyses will be made of the microbial populations in the processes of sewage treatment plants, a potable water impoundment, and lake waters.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DFM

TITLE OF PROJECT: Kinetics and Mechanism in Activated Sludge Processes

GRANTEE OR CONTRACTOR:
Oklahoma State University
Stillwater, Oklahoma 74074

EPA PROJECT OFFICER:
Robert Smith
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Stillwater, Oklahoma

DESCRIPTION OF PROJECT

Award Date: October 7, 1968 **Project Cost:** $32,868

Completion Date: August 31, 1969 **Federal Cost:** $29,622

Summary:

1) A detailed mathematical analysis of operational kinetic equations will be made, and a family of design curves will be developed, which can be used for various values of kinetic constants and operational parameters. 2) Experimental work will be completed on the extent of production and conditions under which organic metabolic products are made and released by the microbial population during metabolism of the original exogenous carbon source. 3) A large portion of the research will be devoted to statistical analysis, correlation and conclusive summarization of all experimental results obtained during the entire course of projects WP-00325, WP-00075, and WP-00786.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DGJ

TITLE OF PROJECT: Electrical Stimulation of Microbial Waste Treatment

GRANTEE OR CONTRACTOR:
The Regents of The University of Michigan
2008 Administration Building
Ann Arbor, Michigan 48104

EPA PROJECT OFFICER:
Cecil Chambers
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Ann Arbor, Michigan

DESCRIPTION OF PROJECT

Award Date: January 10, 1969

Completion Date: April 30, 1970

Project Cost: $64,830

Federal Cost: $61,587

Summary:

To establish operating conditions for stimulating microbial growth and metabolism by electrical techniques and to ascertain design methods for the use of electrically cultures [illegible] bioregenerative waste handling systems.

The program is planned to delineate the effects on microorganisms of various types of electrical stimuli, such as AC, DC, and pulsed; to determine the efficacy of electrical stimuli for increasing the rate of microbial growth and waste handling capability; and to investigate the mechanism of the stimulatory effects.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DHI

TITLE OF PROJECT: "Isolation of Lytic Agents Related to Sphaerotilus"

GRANTEE OR CONTRACTOR:

Randolph-Macon Woman's College
Lynchburg, Virginia 24503

Project Site: Lynchburg, Va.

EPA PROJECT OFFICER:

C. W. Chambers
Robert A. Taft Research Center
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: November 13, 1968

Completion Date: August 31, 1970

Project Cost: $33,587

Federal Cost: $22,588

Summary:

The primary purpose of this project is to isolate and identify the factors responsible for the sudden disappearance of the bulking effect caused by Sphaerotilus in activated sludge.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 DJS

TITLE OF PROJECT: "Oxygen Consumption in Continuous Biological Culture"

GRANTEE OR CONTRACTOR:

University of Kansas
Lawrence, Kansas 66044

Project Site:

EPA PROJECT OFFICER:

Richard Brenner
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: August 25, 1966

Project Cost: $62,859

Completion Date: August 31, 1969

Federal Cost: $53,490

Summary:

To measure the rate of oxygen consumption of nutrient limited, completely mixed, activated sludge systems and to utilize these measurements to develop a theoretical basis for the response of these systems to abrupt changes in the influent nutrient concentration.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (contract)
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DNW
(14-12-465)

TITLE OF PROJECT: "Investigation of the Use of High Purity Oxygen Aeration in the Conventional Activated Sludge Process"

GRANTEE OR CONTRACTOR:
Union Carbide Corporation
Linde Division
P. O. Box 44
Tonawanda, New York 14150

EPA PROJECT OFFICER:
R. C. Brenner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Batavia, New York,
Treatment Plant

DESCRIPTION OF PROJECT

Award Date:	October 16, 1968	Project Cost:	$528,000
Completion Date:	May 16, 1970	Federal Cost:	$528,000

Summary:

The objective of this contract is to improve secondary treatment by utilizing oxygen aeration. A performance and economic comparison of air and pure oxygen aeration in identical 1.25 MGD parallel trains of an existing municipal activated sludge treatment plant will be undertaken. Both trains will be operated on the same wastewater feed under highly controlled aeration conditions. A third parallel unit, a 5-10 gpm pilot plant will investigate process flexibility initially and serve as a second control for later runs. The information gained from this contract will be made available to the professional and design effort in the field.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (CONTRACT) *, Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 DNW
(14-12-867)

TITLE OF PROJECT: Continued Evaluation of Oxygen Use in the Conventional Activated Sludge Process

GRANTEE OR CONTRACTOR:

Linde Division
Union Carbide Corporation
P. O. Box 44
Tonawanda, New York
Project Site: Batavia, New York

EPA PROJECT OFFICER:

Richard C. Brenner
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 30, 1970

Completion Date: October 31, 1971

Project Cost: $239,723

Federal Cost: $239,723

Summary:

The objectives of this continued evaluation (14-12-465) are three fold:

(1) To determine nonvolatile solids profiles, diurnal oxygen uptake rates, and sludge producting and wasting patterns on a full-scale plant employing pure oxygen in the activated sludge process.
(2) On a pilot scale, to determine the feasibility of aerobid sludge stabilization (digestion) with oxygen.
(3) Using a vacuum filter, to conduct dewatering studies on both stabilized sludge and waste activated sludge.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DOF

TITLE OF PROJECT: "Transient Loading Effects in the Activated Sludge Process"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
The Regents of the University of California Berkeley, California 94720	Robert Smith Robert A. Taft Water Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Berkeley, California

DESCRIPTION OF PROJECT

Award Date:	February 11, 1969	Project Cost:	$41,886
Completion Date:	August 31, 1970	Federal Cost:	$39,720

Summary:

To develop process design and operating criteria that will improve the efficiency of solids separation and clarification during sedimentation. The research is a logical continuation of the previous work in this area since it will develop methods to control the process variables significant in producing high quality activated sludge effluents. It has been postulated and preliminary work has demonstrated that improvements in clarification can be achieved through optimizing the turbulence transients that activated sludge experiences immediately prior to cell separation such that the presence of highly dispersed solids in the sludge is minimized. It is anticipated that significant process effluent improvements can be attained through design and operation changes without the addition of chemicals.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as *amended.*

PROJECT NUMBER: 17050 DUT

TITLE OF PROJECT: "The Molecular Nature of Organic Waste Removal Patterns"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Texas A&M Research Foundation P. O. Faculty Exchange H College Station, Texas 77843	Ronald Lewis Robert A. Taft Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: College Station, Texas	

DESCRIPTION OF PROJECT

Award Date: January 1, 1968

Project Cost: $72,000

Completion Date: June 30, 1970

Federal Cost: $68,447

Summary:

The objectives of this project are:

(1) To investigate the behavior of organic compounds in activated sludge systems.

(2) To investigate the use of analytical techniques including total organic carbon and gas chromatography in the characterization of natural waters with regard to identification of organic components.

In accordance with stated objectives, the behavior of representative organic chemicals will be investigated with regard to (a) rate and extent of removal from solution, (b) characterization of intermediate products in solution, (c) effects of molecular structure, and (d) interference effects in multicomponent systems. All analytical data will be catalogued for reference value.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DVO

TITLE OF PROJECT: "Supplementary Aeration of Lagoons in Rigorus Climate Areas"

GRANTEE OR CONTRACTOR:

University of Wyoming
Civil Engineering Department
P. O. Box 3295, University Station
Laramie, Wyoming 82070
Project Site: Laramie, Wyoming

EPA PROJECT OFFICER:

Dr. Robert Bunch
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date:	February 1, 1968	Project Cost:	$80,450
Completion Date:	January 1, 1970	Federal Cost:	$66,536

Summary:

(1) To improve waste treatment by stabilization ponds during critical winter months in areas of severe climate so as to eliminate stream degradation, produce a system design involving aeration.

(2) To define the stream regimen and the effects of urban development

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 DVT (14-12-434)

TITLE OF PROJECT: Development Program for Treatment of Wastewater by Aeration

GRANTEE OR CONTRACTOR:
Rocketdyne Division
North American Rockwell Corporation
6633 Canoga Avenue
Canoga Park, California 91304

EPA PROJECT OFFICER:
Gerald Stern
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Canogo Park, California

DESCRIPTION OF PROJECT

Award Date: June 29, 1968

Project Cost: $80,205

Completion Date: June 21, 1970

Federal Cost: $80,205

Summary:

To develop an effective technique, employing the U-tube aeration principle, for efficiently aerating wastewater. This objective will be met by validating the advantages of U-tube aeration, determining the practicability of the concept and generating design data to permit planning a prototype U-tube system.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *, Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 DVT (68-01-0120)

TITLE OF PROJECT: Experimental Evaluation of Full-Scale U-Tube Water Aeration Systems

GRANTEE OR CONTRACTOR:
Rocketdyne Division
North American Rockwell
6633 Canoga Avenue
Canoga Park, Calif. 91304

EPA PROJECT OFFICER:
Gerald Stern
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Canoga Park, Calif.

DESCRIPTION OF PROJECT

Award Date: June 30, 1971

Project Cost: $25,400

Completion Date: June 30, 1972

Federal Cost: $25,400

. **Summary:**

The objective of this contract is to analyze experimental data from field tests on four full-scale U-tube systems to improve the design bases developed from pilot-scale studies, andincorporate results into Final Report under EPA Contract 14-12-434. The full-scale U-tube systems to be studied consist of two units now in sewer lines at Jefferson Parish, Louisiana (EPA Grant 11010 ELP) and two units to be installed by the Government in sewer lines at Port Arthur, Texas (EPA Grant 11010 DYO).

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DXN (14-12-562)

TITLE OF PROJECT: Development of Immobilized Enzyme System

GRANTEE OR CONTRACTOR:
Grumman Aircraft Engineering Corp.
Bethpage, L.I., New York 11714

EPA PROJECT OFFICER:
Dr. R. L. Bunch
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45258

Project Site: Worcester, Mass. &
L.I., New York

DESCRIPTION OF PROJECT

Award Date: June 30, 1969

Completion Date: May 30, 1970

Project Cost: $36,000

Federal Cost: $36,000

Summary:

The objective of this proposal is to prepare, characterize and evaluate a lyophilized, immobilized enzyme preparation from the material known as the microbial floc or zoogleal film, demonstrated to be the material responsible for the biological removal and degradation of waste water effluents.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 DZE

TITLE OF PROJECT: Reclamation of Wastewater by Controlled Biological Kinetics

GRANTEE OR CONTRACTOR:
City of Chino, California
P. O. Box 607
Chino, California 91710

EPA PROJECT OFFICER:
Gerald Stern
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Chino, California

DESCRIPTION OF PROJECT

Award Date: December 27, 1966

Project Cost: $1,119,339

Completion Date: December 1, 1972

Federal Cost: $ 829,816

Summary:
The objectives of this project are (a) to demonstrate a novel method of utilizing the activated sludge process for both secondary and tertiary treatment, through using a design which permits: (1) greatly increased organic loadings; (2) high rates of cell production resulting in high nutrient removal; and (3) greatly reduced plant construction costs, and (b) to create reclaimed water for use in the proposed Prado Regional Park being planned and developed by San Bernardino County.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 EAN

TITLE OF PROJECT: Treatment of Wastes Using Peat, and Peat in Combination with Soil

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
State of Minnesota	G. K. Dotson
Department of Iron Range	Robert A. Taft Water Research Div.
Resources and Rehab.	Columbia Parkway Bldg.
55 Sherburne Avenue	Environmental Protection Agency
St. Paul, Minnesota 55103	Cincinnati, Ohio 45268

Project Site: Wilderness Valley Farms
St. Louis County, Minnesota

DESCRIPTION OF PROJECT

Award Date: June 3, 1969 **Project Cost:** $140,929

Completion Date: March 31, 1971 **Federal Cost:** $ 85,871

Summary:

The overall objectives of this project are to determine the filtering ability of peat and peat-soil combinations both in the field and laboratory as adsorptive systems for removing nutrient and organic pollutants in waste waters.

a. Objectives of the field studies are to investigate the possibilities of using peat over soils and peat mixed with natural soils in place to maximize nutrient and BOD removal of waste water applied at moderate to high rates using spray irrigation and ridge and furrow disposal systems.

b. Objectives of the laboratory studies are to determine under carefully controlled conditions the physical, chemical and microbiological adsorption phenomen by peat described in the final report of FWQA Grant WPD-164-02-68.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 EBM

TITLE OF PROJECT: " Rotating Biological Disc Wastewater Treatment Process Pilot Plant Evaluation"

GRANTEE OR CONTRACTOR:

Rutgers, The State University
New Brunswick, N. J.

EPA PROJECT OFFICER:

Dr. Hend Gorchev
EPA Region I Office
John F. Kennedy Bldg.
Boston, Massachusetts 02203

Project Site: Jamaica, Long Island Wastewater Treatment Plant

DESCRIPTION OF PROJECT

Award Date: October 17, 1967 Project Cost: $310,478

Completion Date: May 18, 1970 Federal Cost: $215,660

Summary:

The objective of this proposal is to exploit the activities of attached biological growths on closely spaced rotating disks alternately submerged in sewage and exposed to air for high degree removal of organic matter, nitrogen and phosphorus. It is proposed to utilize a series of such units for sequential treatment and the resulant establishment of sequential specialized populations. It is expected that neither artificial aeration nor secondary sedimentation will be necessary by virtue of the fact that the biological growths will not be allowed to accumulate to great thickness and will, therefore, not slough off but instead they will be removed at will after they have reached the logarithmic stage of growth.

To establish the maximum efficiency, basis for design, and economy of the biological rotating disc process for wastewater treatment. The general approach towards accomplishing these objectives is as follows: a) To evaluate the effects on treatment efficiency of stressing the hydraulic and organic loads. b) To define the relationships between the detention period, surface area concentration and disc rotational velocity on the ability of the pilot plant to take load without sacrificing treatment efficiency.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 EDL

TITLE OF PROJECT: "High-Performance Bio-Treatment of Municipal Sewage"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
New York State Health Depart.	Dr. Robert L. Bunch Robert A. Taft Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Greene County, New York	

DESCRIPTION OF PROJECT

Award Date: June 21, 1968	Project Cost: $662,147
Completion Date: June 21, 1972	Federal Cost: $371,125

Summary:

The project objectives are to develop a high rate biological treatment process that is, especially for the smaller communities, compatible with modern technology. The goal will be to develop an entire waste treatment facility that will have greater removal efficiencies of suspended solids, BOD, and phosphates. The 120,000 GPD pilot plant at New York State Vocational Institute in West Coxsachie, New York, will demonstrate the greater efficiencies with greater economy of capital cost, operating cost, and space than that of conventional methods of biological treatment. During the 4-year program, the operational and design parameters will be developed for an efficient, reliable treatment process. The comprehensive development program will include the use of an aerated equalization tank, aeration regime optimization for the split biological culture (high and low biological activity), evaluation of multi-compartment horizontal flow clarifiers, intermediate up-flow clarification techniques, aerobic sludge digestion and chlorination of the sludge (Purifax process).

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 EEO

TITLE OF PROJECT: Integrated Activated Sludge Biological Filter Process

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of San Buenaventura, Calif. Ventura, California	John N. English Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: San Buenaventura, California

DESCRIPTION OF PROJECT

Award Date: December 1966 **Project Cost:** $120,301

Completion Date: December 1969 **Federal Cost:** $ 90,226

Summary:

The objective of this project is to demonstrate the feasibility and economics of treating domestic sewage with either an activated sludge process followed by a trickling filter or by a trickling filter process followed by activated sludge.

The activated sludge and trickling filter processes are reliable individual treatment methods. The need to control pollution and increase the efficiencies of existing plants requires specific design and operational data on the combined processes to enable the use of existing or expended facilities; for economy, this will involve or necessitate the addition of activated sludge to an existing trickling filter plant or vice verse.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 EEY (14-12-168)

TITLE OF PROJECT: Oxygenation of Aqueous Bodies Using Liquid Oxygen-LOXination

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Midwest Research Institute 425 Volker Boulevard Kansas City, Missouri 64110	Robert A. Wise Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Kansas City, Missouri

DESCRIPTION OF PROJECT

Award Date: June 4, 1968 **Project Cost:** $89,346

Completion Date: April 3, 1970 **Federal Cost:** $89,346

Summary:

A study of the parameters controlling the transfer of liquid oxygen (i.e., LOX) to dilute aqueons solutions (natural waters, sewage effluent, and sludges) will be made. Included in this study will be measurements of the oxygen transfer coefficient, design of suitable oxygenation equipment, development of application techniques, and process cost calculations. These cost calculations will permit accurate comparisons of the cost of accomplishing various levels of oxygen enrichment with LOX vs. mechanical or compressed gaseous oxygen aeration.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) , *Federal Water Pollution Control Act (PL 84-660), as* *amended.*

PROJECT NUMBER: 17050 EGI (14-12-586)

TITLE OF PROJECT: Powdered Carbon Treatment of Raw Sewage and Primary Effluent in Slurry-Contactor Clarifers

GRANTEE OR CONTRACTOR:
Westinghouse Electric Company
Infilco Division
P. O. Box 50303
Tucson, Arizona 85703

EPA PROJECT OFFICER:
Mr. C. L. Berg
Environmental Protection Agency
5555 Ridge Avenue
Cincinnati, Ohio 45236

Project Site: Tucson, Arizona

DESCRIPTION OF PROJECT

Award Date: June 30, 1969

Project Cost: $126,355

Completion Date: July 31, 1971

Federal Cost: $126,355

Summary:

The work proposed constitutes an extension of current contract research during which two-stage, powdered activated carbon treatment of effluent from a municipal activated sludge sewage treatment system has been studied in the laboratory and on a pilot plant scale at Tucson, Arizona.

The objective is evaluation of the potential for substitution of two-stage powdered activated carbon treatment for secondary biological treatment of municipal wastewater. Treatment of both primary effluent and screened and degritted raw sewage will be studied, with emphasis, however, on the latter because primary solids can presumably be processed for disposal through the carbon reactivation system which is required for economically practicable powdered carbon treatment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 EHG

TITLE OF PROJECT: "Reverse Osmosis Treatment of Wastewaters"

GRANTEE OR CONTRACTOR:

University of Massachusetts
Amherst, Massachusetts 01002

EPA PROJECT OFFICER:

Warren A. Schwartz
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Amherst, Massachusetts

DESCRIPTION OF PROJECT

Award Date: June 28, 1968

Completion Date: May 31, 1971

Project Cost: $155,906

Federal Cost: $117,051

Summary:

The objectives of this project are: (1) to develop reverse osmosis design parameters for presently available membranes with selected organic and inorganic solutes as feeds by measuring flux, organic rejection, and other RO cell performance; (2) to apply the above data toward development of membrane separation techniques for treatment of industrial wastes and municipal sewage, and to examine RO applications of (2) above in connection with physical-chemical pretreatment.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6(a)2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 ENM

TITLE OF PROJECT: "Full Scale Parallel Activated Sludge Process Evaluation"

GRANTEE OR CONTRACTOR:
Water and Sewer Commission
City of Freeport
230 West Stephenson Street
Freeport, Illinois 61032

Project Site: Freeport, Ill.

EPA PROJECT OFFICER:

Mr. Richard G. Eilers
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: August 15, 1969

Completion Date: January 31, 1972

Project Cost: $169,570

Federal Cost: $127,178

Summary:

The objective os this project is to evaluate the parallel performance of several activated sludge process modifications on a full-scale basis. The emphasis will be on the completely mixed (homogeneous) process modification. Four 140,000 gallon aeration tanks and four final settling tanks with the necessary sampling and flow measurement equipment will be utilized. The total average daily flow during the study period will be 4 to 4.5 mgd. This flow can be divided as needed for the various flow systems. The aeration system is equipped with additional capacity and flexibility for the study.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 EOY
(14-12-419)

TITLE OF PROJECT: "Bio-Mass Determination - A New Technique for the Control of Aeration Sewage Treatment Processes"

GRANTEE OR CONTRACTOR:

Biospherics Research, Inc.
4928 Wyaconda Road
Rockville, Maryland 20853

Project Site: Washington, D. C.

EPA PROJECT OFFICER:

Dr. Robert L. Bunch
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 28, 1968

Project Cost: $122,629

Completion Date: April 30, 1970

Federal Cost: $122,629

Summary:

To examine a new method, conceived and developed by personnel of Biospherics Research, Inc., for the rapid determination of bio-mass and to assess the feasibility of applying this method in the control of sewage treatment processes. The proposed method is the firefly bioluminescent assay for microbial adenosinetriphosphate.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 EOY
(14-12-871)

TITLE OF PROJECT: "Biomass Determination - A New Technique for the Control of Aeration Sewage Treatment Processes"

GRANTEE OR CONTRACTOR:

Biospherics Incorporated
4928 Wyaconda Road
Rockville, Maryland 20853

Project Site: Rockville, Maryland

EPA PROJECT OFFICER:

Dr. Robert L. Bunch
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date:	July 29, 1970	Project Cost:	$69,350
Completion Date:	June 1, 1972	Federal Cost:	$69,350

Summary:

The objective of this contract extension is to further develop and adapt the assay for adenosinetriphosphate (ATP) as a means for determining the biomass of activated sludge and apply this method to the control of the activated sludge waste treatment process. Two adenosinetriphosphate (ATP) assay instruments will be delivered for testing by EPA laboratories.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 EVF

TITLE OF PROJECT: "Automatic Control of a Completely Mixed Activated Sludge Reactor"

GRANTEE OR CONTRACTOR:

Department of Chemical Engineering
University of Connecticut
Storrs, Connecticut 06268

Project Site: Storrs, Connecticut

EPA PROJECT OFFICER:

Mr. Robert Smith
Robert A. Taft Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 16, 1968

Completion Date: June 15, 1970

Project Cost: $36,134

Federal Cost: $21,775

Summary:

The efficiency and costs involved with automatic control of a completely mixed activated sludge reactor will be determined. Work will include:

(a) Design of a feed forward control scheme on a pilot activated sludge reactor using the data obtained during the first phases of this program.

(b) Comparison of the performance of the reactor in the control and uncontrolled modes.

(c) Obtain operating data on a feed forward controlled reactor handling domestic wastes to aid in the design of control systems for municipal plants.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 FAI

TITLE OF PROJECT: "Primary and Secondary Treatment Pilot Plant"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Government of the District of Columbia Department of Sanitary Washington, D. D. 20004	Fred Bishop EPA/D. C. Pilot Plant 5000 Overlook Avenue, S. W. Washington, D. C. 20032

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date:	December 23, 1966	Project Cost:	$911,683
Completion Date:	June 23, 1971	Federal Cost:	$600,000

Summary:

The objectives of the project are: (1) to study nutrient removal by biological treatment; (2) to optimize the aeration processes and (3) to develop the optimum combination of biological and tertiary treatment for water pollution control and for water reuse with attendant cost-quality relationships.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 FIM
(14-12-198)

TITLE OF PROJECT: "Research and Field Engineering Studies for Optimizing Lipid Biostabilization Processes"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Midwest Research Institute 425 Volker Boulevard Kansas City, Missouri 64110	Mr. Cecil Chambers Robert A. Taft Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Kansas City, Missouri	

DESCRIPTION OF PROJECT

Award Date: May 28, 1968	Project Cost: $59,813
Completion Date: April 30, 1970	Federal Cost: $59,813

Summary:

To improve the biostabilization of lipids which normally accumulate in the top layers of anaerobic digesters. This would be accomplished by using high-shear homogenization to create a large interfacial area between aqueous and lipid phases.

The study program is proposed in two parts. Part 1 is a laboratory bench scale model utilizing four-liter anaerobic reactors to investigate the effect of homogenization. Part 1 would be summarized and completed with a process evaluation as a prelude to a field study. Part 2 is a field study applying the findings of Part 1 to a full scale treatment plant.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 (CONTRACT) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 FPA
(14-12-167)
TITLE OF PROJECT: "A&E Design Services

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Roy F. Weston	Fred Bishop
Environmental Science and Engineering	Environmental Protection Agency D. C. Pilot Plant
1426 Lewis Lane	5000 Overlook Avenue, S. W.
West Chester, Pennsylvania 19380	Washington, D. C. 20032

Project Site:

DESCRIPTION OF PROJECT

Award Date: April 10, 1968 Project Cost: $56,430

Completion Date: April 30, 1970 Federal Cost: $56,430

Summary:

Architectural and engineering services for the design of FWPCA-District of Columbia Biological Treatment Pilot Plant.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 FSL

TITLE OF PROJECT: "Investigations of Zoogleal Flocs"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Wisconsin Madison, Wisconsin 53706	Harold C. Foust Office of Research and Monitoring Municipal Technology Division Process Development Section Washington, D. C. 20460

Project Site: Madison, Wisconsin

DESCRIPTION OF PROJECT

Award Date:	September 1, 1965	Project Cost:	$130,057
Completion Date:	November 30, 1969	Federal Cost:	$128,418

Summary:

The project is divided into three general areas of (a) Factors affecting flocculation (b) Investigations of kinetic and diffusional phenomena is substrate uptake and (c) Taxonomic and metabolic studies of Zoogleal species. Apparatus has been constructed for observing the flocculation of Zoogleal species under different shear fields.

Field investigations of activated sludge are being conducted in an effort to correlate the findings in the laboratory with actual field observations. Techniques obtained in the laboratory are being used to characterize field conditions.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17050 GAI

TITLE OF PROJECT: Measurement of Active Biomass Concentrations in Biological Waste Treatment Processes

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Georgia Institute of Technology School of Civil Engineering Atlanta, Georgia 30332	Dr. Ronald F. Lewis Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Atlanta, Georgia

DESCRIPTION OF PROJECT

Award Date:	September 1, 1970	**Project Cost:**	$64,402
Completion Date:	September 19, 1972	**Federal Cost:**	$50,327

Summary:

The purpose of this project is to define the applicability and limitations of the dehydrogenase test for measurement of the active biomass used during treatment of domestic and industrial wastewaters. The specific objectives are: (a) to study the effects of nutritional deficiencies and varying organic content of wastewaters on the dehydrogenase activities of biological sludges; (b) to study the relationship between the active biomass concentrations and dehydrogenase activities of the biological sludges undergoing endogenous metabolism; and (c) to develop a laboratory procedure for correlating dehydrogenase activities with the active biomass concentrations of biological sludges obtained from prototype domestic and industrial treatment processes.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 (Contract), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 GIU (68-01-0042)

TITLE OF PROJECT: Laboratory Evaluation of a Method for Enhancing the Kinetics of Activated Sludge Treatment Plants

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Houston Research, Inc. 8330 Broadway Houston, Texas 77017	Dr. Ronald F. Lewis Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Houston, Texas

DESCRIPTION OF PROJECT

Award Date:	May 21, 1971	**Project Cost:**	$32,528
Completion Date:	October 21, 1971	**Federal Cost:**	$32,528

Summary:

The objective of this project is to determine the technical feasibility that the disruption of a portion of the microbial cells in the return sludge will enhance the operating efficiency and capacity of municipal activated sludge plants. This will be accomplished by laboratory evaluation determining the effect of return sludge disruption on the rate of biological oxidation of specific sewage components (linear alkyl sulfonates, ethylene glycol, nitrilotriacetate, ethylene diaminotetracetic acid, and 2-4 dichlorophenol). Studies will also examine the effect of cell disruption on the physical and chemical characteristics of activated sludge plant operations. This will be accomplished in a continuous flow laboratory bench reactor. A report of the findings will be made at the conclusion of these studies.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 GUJ

TITLE OF PROJECT: Actinomycetes of Sewage-Treatment Plants

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Rutgers University - The State University of New Jersey Institute of Microbiology New Brunswick, New Jersey 08903	Dr. Ronald F. Lewis Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: New Brunswick, N. J.

DESCRIPTION OF PROJECT

Award Date: March 9, 1971 Project Cost: $37,392

Completion Date: February 29, 1972 Federal Cost: $33,278

Summary:

The objectives of the project are:

1. To determine the systematic position of actinomycetes growing in sewage treatment plants.
2. To investigate the ecological factors responsible for the growth of these organisms in sewage treatment plants.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17050 HKX

TITLE OF PROJECT: A Simplified Method of High Purity Oxygen Injection into Activated Sludge Processes

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Board of Directors Las Virgenes Municipal Water District Calabasas, California 91302	Mr. Richard C. Brenner Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Calabasas, California 91302

DESCRIPTION OF PROJECT

Award Date: June 28, 1971	**Project Cost:** $210,066
Completion Date: December 31, 1972	**Federal Cost:** $157,549

. Summary:

The objective of this project is to demonstrate expansion of an existing activated sludge plant by a simplified single stage oxygen contact system, using existing tanks, blowers and diffusers to greatly reduce the cost of dissolution equipment. The Tapia Water Reclamation Facility at Calabasas will be modified and run for nine months. Data on oxygen consumption, effluent quality, solids production and other pertinent data will be collected. Data derived from this project should permit the reliable sizing of other plant modifications.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: WP-00922-03 (1705)

TITLE OF PROJECT: The Effect of Gas Bubble Motion on Fluid Mixing in Aeration Process

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Syracuse University Syracuse, New York 13210	Dr. Robert L. Bunch Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Syracuse, New York

DESCRIPTION OF PROJECT

Award Date: June 28, 1966	Project Cost: $57,268
Completion Date: June 28, 1969	Federal Cost: $55,318

Summary:

(1) To study analytically the effective diffusivity Deff, in liquid phase due to bubble motion. (2) To determine experimentally the effective diffusivity and obtain a correlation between Deff and bubble parameters such as bubble size, bubble frequency and density. (3) To study the liquid phase mass transfer in a bubbling system.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: WP-00961-03 (1705)

TITLE OF PROJECT: Bacteriology of Biodegradable Surfactants

GRANTEE OR CONTRACTOR: Los Angeles State College Foundation Los Angeles, Calif. 90032	EPA PROJECT OFFICER: Dr. Robert L. Bunch Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Los Angeles, Calif.

DESCRIPTION OF PROJECT

Award Date: June 20, 1966	Project Cost: $28,995
Completion Date: June 20, 1969	Federal Cost: $27,802

Summary:
1) Determine if an isolate utilizing LAS can utilize new nonionic surfacts; 2) In terms of item (1) establish biodegradability spectrum; 3) Investigate synergistic effects; 4) Compare relative numbers of bacteria at different stages of activated sludge and septic tank operation with bacteria in effluents; 5) Determine if surfactant molecule is degraded to CO_2 and H_2O.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: WPD 164 (1705)

TITLE OF PROJECT: Peat Bog Waste Stabilization

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
State of Minnesota	Dr. C. C. Harlin
Department of Iron Range Resources and Rehabilitation	Robert S. Kerr Water Research Center
	P. O. Box 1198
St. Paul, Minnesota 55101	Ada, Oklahoma

Project Site: St. Paul, Minnesota

DESCRIPTION OF PROJECT

Award Date: March 1, 1967	**Project Cost:** $185,825
Completion Date: March 1, 1969	**Federal Cost:** $122,635

Summary:
To study a phenomenon whereby wood products wastewater has become biologically stabilized while in contact with peat.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract,) *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 1705 (14-12-129)

TITLE OF PROJECT: Identification of Limiting Factors in the Biological Treatment of Sewage

GRANTEE OR CONTRACTOR:
Biospherics Research, Inc.
4928 Wyaconda Road
Rockville, Maryland 20853

EPA PROJECT OFFICER:
Dr. Robert L. Bunch
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date: August 1, 1967

Project Cost: $15,000

Completion Date: August 1, 1968

Federal Cost: $15,000

Summary:

The purpose of this contract is to explore the microbiological and biochemical wastewater literature to determine the intrinsic factors which limit the effectiveness of biological treatment of sewage. Comparisons of the fundamental microbial metabolic rates with those achieved in practice will be made. The information gained will be used to dientify significant areas in which sewage treatment does not take full advantage of the biological processes. Once these areas are identified, laboratory and pilot plant research programs can be designed to develop improved treatment methods and practices. The information developed will be particularly useful in purifying the input to a mathematical model describing the activated sludge process which is being developed at the Cincinnati Water Research Laboratory.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) , *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 1705 (14-12-147)

TITLE OF PROJECT: A Conceptual Study of the District of Columbia Biological Treatment Pilot Plant

GRANTEE OR CONTRACTOR:
Roy F. Weston
1426 Lewis Lane
West Chester, Pennsylvania 19380

EPA PROJECT OFFICER:
Dolloff F. Bishop
EPA/DC Pilot Plant
5000 Overlook Avenue, S. W.
Washington, D. C. 20032

Project Site: West Chester, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: January 1, 1968

Project Cost: $2,000

Completion Date: March 1,1968

Federal Cost: $2,000

Summary:

I. Study Criteria
   A. Evaluate the process layout and hydraulic requirements of the two train (100,000 gpd per train) biological treatment pilot plant as described in the attached specification for installation at the District of Columbia Water Pollution Control Plant.
   B. Develop a sludge disposal system for the above pilot plant which includes:
      1. Sludge dewatering systems
         a. vacuum filtration
         b. centrifugation
         c. experimental dewatering
      2. Sludge incineration
   C. Prepare functional process layout for two larger pilot plants based on the design criteria and flexibility in above D. C. pilot plant and including sludge disposal facilities for plant sized with:
      1. Two nominal 250,000 gal per day treatment trains
      2. Two nominal 500,000 gal per day treatment trains
   D. Furnish a cost estimate for the (100,000 gpd/train) pilot plant in A above.

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1705 (14-12-149)

TITLE OF PROJECT: A Conceptual Study of the District of Columbia Biological Treatment Pilot Plant

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Swindell-Dressler Co. Pittsburgh, Pennsylvania	Mr. Dolloff F. Bishop EPA/DC Pilot Plant 5000 Overlook Avenue, S. W. Washington, D. C. 20032

Project Site: Pittsburth, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: January 1, 1968	**Project Cost:** $2,000
Completion Date: March 1, 1968	**Federal Cost:** $2,000

Summary:

1. Study Criteria
   - A. Evaluate the process layout and hydraulic requirements of the two train (100,000 gpd per train) biological treatment pilot plant as described in the attached specification for installation at the District of Columbia Water Pollution Control Plant.
   - B. Develop a sludge disposal system for the above pilot plant which includes:
     1. Sludge dewatering systems
        - a. vacuum filtration
        - b. centrifugation
        - c. experimental dewatering
     2. Sludge incineration
   - C. Prepare functional process layout for two larger pilot plants based on the design criteria and flexibility in above D. C. pilot plant and including disposal facilities for plant sized with:
     1. Two nominal 250,000 gal per day treatment trains
     2. Two nominal 500,000 gal per day treatment trains
   - D. Furnish a cost estimate for the (100,000 gpd/train) pilot plant in A above.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT), *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17050 (14-12-151)

TITLE OF PROJECT: "A Conceptual Study of the District of Columbia Biological Treatment Pilot Plant"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Burns and Roe, Inc. 700 Kinderkamack Road Oradell, New Jersey 07649	Fred Bishop EPA/ D. C. Pilot Plant 5000 Overlook Avenue, S. W. Washington, D. C. 20032

Project Site: Oradell, New Jersey

DESCRIPTION OF PROJECT

Award Date:	January 1, 1968	Project Cost:	$2,000
Completion Date:	March 1, 1968	Federal Cost:	$2,000

Summary:

I. Study Criteria
   A. Evaluate the process layout and hydraulic requirements of the two train (100,000 gpd per train) biological treatment pilot plant as described in the attached specification for installation at the District of Columbia Water Pollution Control Plant.

   B. Develop a sludge disposal system for the above pilot plant which includes:
      1. Sludge dewatering systems
         a. vacuum filtration
         b. centrifugation
         c. experimental dewatering

      2. Sludge incineration

   C. Prepare functional process layout for two larger pilot plants based on the design criteria and flexibility in above D. C. pilot plant and including disposal facilities for plant sized with:
      1. Two nominal 250,000 gal per day treatment trains
      2. Two nominal 500,000 gal per day treatment trains

   D. Furnish a cost estimate for the (100,000 gpd/train) pilot plant in A above

MICROORGANISMS REMOVAL

11.A

MICROORGANISMS REMOVAL

Incomplete elimination or destruction of pathogenic organisms in sewage and industrial wastes poses a health hazard for users of the effluent-receiving waters. Methods and technology must be developed for safe and economic disinfection of sewage and renovated water. The treatment of municipal wastewater for direct reuse is inevitable; recreational use of renovated waste will increase in areas which lack surface water. Without adequate disinfection, these programs cannot be implemented.

Technology and methodology necessary to formulate policy regarding disinfection techniques including virus inactivation are required. The evaluation and demonstration of alternate disinfection processes (both chemical and physical) will provide design information to incorporate in existing and new wastewater treatment plants. Guidelines for National use are required to establish a uniform method of disinfection which is efficient and has a non-toxic effect on receiving waters. A search for a new indicator organisms to provide a wider margin of disinfection safety than E. coli, and better techniques for isolation of viruses in large quantities of water are required.

PROJECT INDEX

PPB 17060 - Microorganisms Removal

17060	Grantee or Contractor	Project Status *	Page
DDU	University of Cincinnati	E	11-5
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DTO	University of Maine	E	11-7
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EYZ	University of Illinois	C	11-9
FAA	Community of St. Michaels, Maryland	B	11-10
HJB	City of Wyoming, Michigan	C	11-11
WP-00009	University of New Hampshire	E	11-12
WPD-19	City of Gainesville, Florida	E	11-13
14-12-418	Charles Pfizer & Co., Inc.	E	11-14

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17060 DDU (14-12-567)

TITLE OF PROJECT: A Comparative Study of the Inactivation of Viruses in Waste, Renovated and Other Waters by Chlorine and Chlorine Compounds

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
University of Cincinnati Cincinnati, Ohio 45221	Dr. Gerald Berg Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Cincinnati, Ohio

DESCRIPTION OF PROJECT

Award Date:	June 26, 1969	**Project Cost:**	$141,790
Completion Date:	December 31, 1971	**Federal Cost:**	$141,790

Summary:

Determine the capability of chlorine and certain of its compounds to destroy viruses in waste, renovated, and in other waters. Various concentrations of chlorine and its compounds will be applied for various contact time periods to wastewater with high and low chlorine demand, and also to demand free buffered water systems to establish base lines, and virus survival in such waters will be determined. Disinfectant concentration, pH and temperature of the experimental system are other variables to be studied.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17060 DNU

TITLE OF PROJECT: Disinfection of Sewage Effluents

GRANTEE OR CONTRACTOR:
University of Illinois
Box 232
Urbana, Illinois 61801

EPA PROJECT OFFICER:
Mr. Cecil Chambers
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Urbana, Illinois

DESCRIPTION OF PROJECT

Award Date: September 25, 1967 **Project Cost:** $72,216

Completion Date: September 30, 1969 **Federal Cost:** $48,937

Summary:

A study is being made of the effectiveness of bromine as a disinfectant for treating sewage effluents under varied conditions of temperature, pH, and bromine concentration in parallel with a study with chlorine as the disinfectant. Disinfection is being measured in terms of coliform, fecal coliform, and total bacterial numbers.

In addition, two streams receiving treated effluents, one chlorinated and the other to be chlorinated in the near future, are being surveyed to determine the effect of chlorination on both bacterial counts and general stream chemistry.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17060 DTO

TITLE OF PROJECT: Effects of Chemical Ions on Virus Inactivation

GRANTEE OR CONTRACTOR:
University of Maine
Orono, Maine 04473

EPA PROJECT OFFICER:
Gerald Berg
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Orono, Maine

DESCRIPTION OF PROJECT

Award Date: January 1, 1964	**Project Cost:** $177,670
Completion Date: December 31, 1969	**Federal Cost:** $171,668

Summary:

The specific aim of this project is to determine the relationships involved in the removal of an animal virus by various water and waste-water treatment unit processes as the conditions of the influent water are changed. The treatment processes to be investigated would be chemical coagulation, disinfection and adsorption on activated carbon. The influent water would have the chemical ions varied in species and concentration.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17060 EAM

TITLE OF PROJECT: The Detection and Inactivation of Enteric Viruses in Waste Water

GRANTEE OR CONTRACTOR:
Hebrew University
Jerusalem, Israel

EPA PROJECT OFFICER:
Dr. Gerald Berg
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Jerusalem, Israel

DESCRIPTION OF PROJECT

Award Date: June 10, 1969 **Project Cost:** $398,500

Completion Date: September 30, 1972 **Federal Cost:** $363,626

Summary:

The purposes of the project are (1) to develop and refine efficient and inexpensive monitoring methods for the detection and quantitative assay of low levels of viruses in large volumes of water and waste water; (2) to study the mechanisms of virus inactivation by disinfection and other selected waste water treatment procedures with one aim of developing optimal and economically feasible techniques for the control of enteric viruses that can pollute the water environment; (3) to study techniques for the effective control of virus contamination in waste water renovation programs with particular emphasis on ground water recharge and direct agricultural utilization. The project will be carried out by laboratory, pilot plant as well as full scale field studies. The Environmental Health Laboratory of the Hebrew University - Hadassah Medical School - will serve as the focus for the laboratory and pilot plant phase of the work, while existing full scale waste treatment facilities adjacent to the Medical Center will be made available for the field study phases. In addition various other full scale waste water treatment and reclamation facilities will be available for study purposes.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17060 EYZ

TITLE OF PROJECT: New Microbial Indicators of Wastewater Chlorination Efficiency

GRANTEE OR CONTRACTOR:
University of Illinois
Urbana, Illinois 61801

EPA PROJECT OFFICER:
Cecil W. Chambers
Robert A. Taft Water Research Div.
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Urbana, Illinois

DESCRIPTION OF PROJECT

Award Date: December 16, 1969

Project Cost: $100,488

Completion Date: March 21, 1972

Federal Cost: $ 87,618

Summary:

The primary objective of this project is to find a more suitable and reliable indicator of the destruction of enteric pathogens by chlorine and to develop a simple and rapid means of determining the numbers of such an indicator in chlorinated wastewater effluents. Laboratory studies are being undertaken to isolate and identify organisms which may be suitable for use as indicators of the efficiency of wastewater effluent chlorination. Screening by chlorinating activated sludge, trickling filter, and oxidation pond effluents are being employed to provide isolates which are chlorine resistant. Media and growth conditions are varied so as not to eliminate from consideration organisms of high chlorine resistance which may fail to proliferate under commonly used growth conditions. The chlorine resistance of successful isolates is being studied in detail under controlled laboratory conditions both in pure and mixed cultures and under varying concentrations and different chemical species of chlorine. When acceptable chlorine resistance of several organisms has been established, these will be compared to the resistance of selected enteric pathogens as well as coliform bacteria. At the same time a rapid and simple means of quantitative detection of the proposed indicator will be developed.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17060 FAA

TITLE OF PROJECT: "Controlled Treatment System"

GRANTEE OR CONTRACTOR:

Community of St. Michaels
St. Michaels, Maryland

EPA PROJECT OFFICER:

Cecil Chambers
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: St. Michaels, Md.

DESCRIPTION OF PROJECT

Award Date: April 17, 1968

Project Cost: $130,360

Completion Date: October 30, 1969

Federal Cost: $ 97,770

Summary:

A controlled treatment system comprising a chemical treatment unit for reducing the turbidity and suspended solids level of the effluent from a conventional biological treatment plant, an ultraviolet light disinfection unit, a holding lagoon for receiving flow which is by-passed as a result of a malfunction of the chemical treatment and/or UV units, and a notification system which automatically tells a responsible person of the malfunction and the consequent by-passing of the effluent stream. Suitable piping, gates, auxiliary controls, and instrumentation are provided to make for semi-automatic operation of the controlled treatment system. The significant feature is the applicatin of UV disinfection to the treatment of wastewaters and the production of a plant effluent suitable for disposal into shellfish growing waters.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17060 HJB

TITLE OF PROJECT: "Parallel Ozonation and Chlorination with Dechlorination of Chlorinated Effluent"

GRANTEE OR CONTRACTOR:

City of Wyoming
1155 28th Street, S. W.
Wyoming, Michigan 49509

EPA PROJECT OFFICER:

Cecil Chambers
Robert A. Taft Water Research Division
Columbia Parkway Bldg.
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Wyoming and Grandville, Michigan

DESCRIPTION OF PROJECT

Award Date: June 29, 1971

Project Cost: $526,896

Completion Date: March 31, 1974

Federal Cost: $500,549

Summary:

The primary objective of this project is to disinfect parallel streams of effluent from an activated sludge and a trickling filter wastewater treatment plant with chlorine and ozone. Part of the chlorinated effluent stream will be dechlorinated with sulfur dioxide. The chlorinated, dechlorinated, and ozonated streams, and a control stream of the same effluent, would be compared for their toxic effect on several species of fish and macroinvertebrates. Disinfectant dosage will be controlled at levels sufficient to yield effluents having a total coliform count not to exceed 1,000 per 100 ml, but use of gross excesses of disinfectant beyond the amount necessary to yield the desired reduction in coliform content will be avoided. Results obtained will provide a basis for determining which system of treatment will combine the desired level of disinfection with the lowest toxic effect on the biological forms used in the tests. The design flow rate to be used, at both the Wyoming and Grandville treatment plants, shall be 50,000 GPD for the dechlorination process and 5,000 GPD for the ozonation process.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: WP-00009-12 (1706)

TITLE OF PROJECT: Enteric Bacteria and Viruses in Sewage, Water and Shellfish

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of New Hampshire, Durham	Dr. Gerald Berg Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Durham, North Carolina

DESCRIPTION OF PROJECT

Award Date: August 8, 1956 Project Cost: $440,000

Completion Date: September 1, 1965 Federal Cost: $430,000

Summary:

Studies will be continued on the correlation of numbers of coliforms, fecal coliforms, and fecal streptococci with the presence of salmonellae and enteroviruses in seawater and oyster samples collected from stations in our bay and estuarine areas. Particular attention will be given to the detection of salmonellae and viruses in oysters harvested from shellfish growing waters considered to be of approved sanitary quality based on recommended coliform standards. Hydrographic conditions in the study areas will be determined to establish the possible impact of such conditions on the microbiological data obtained. Studies will also be continued to assess the efficiency of newly installed sewage treatment plants in eliminating enteric bacteria and enteroviruses in seawater and shellfish at sampling stations in several estuarine and bay areas. The effectiveness of depuration procedures for providing shellfish of acceptable microbiological quality will be determined using shellfish harboring indicator bacteria, salmonellae, and enteroviruses.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: WPD 19-06-68 (1706)

TITLE OF PROJECT: To Demonstrate the Effectiveness of Iodine for the Disinfection of Public Water Supplies and to Determine the Physiological Effects on a Human Population

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Gainesville Public Utilities P. O. Box 490 Gainesville, Florida	Mr. Cecil Chambers Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Gainesville, Florida

DESCRIPTION OF PROJECT

Award Date: April 1, 1963	Project Cost: $594,640
Completion Date: March 3, 1969	Federal Cost: $407,790

Summary:

To identify and evaluate the various physical, chemical and biological factors which are operative in the gross pollution, by both sewage and industrial wastes, of porous or cavernous underground aquifers and to develop methods for its control. To identify taste and odor producing compounds formed by the reaction of iodine with organic pollutants; to study the effectiveness of iodine for the disinfection of swimming pool water.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Contract) *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 1706 (14-12-418)

TITLE OF PROJECT: Applications of Powdered Magnetic Iron Oxide to the Removal of Pathogenic Microorganisms from Water

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Charles Pfizer & Co., Inc. Terre Haute, Indiana	Dr. Gerald Berg Robert A. Taft Water Research Div. Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Terre Haute, Indiana

DESCRIPTION OF PROJECT

Award Date: June 29, 1968	Project Cost: $58,402
Completion Date: June 30, 1969	Federal Cost: $58,402

. Summary:

Concentration of viruses on powdered iron oxide will be studied as a means for detecting small quantities of viruses in large volumes of water, and for removal of viruses from water. After separation of the iron oxide (carrying adsorbed viruses) in a magnetic field, elution of the viruses from the oxide with high concentrations of sulfate, carbonate, or phosphate ion will be done. Adsorption and elution of viruses to and from the oxide with electrical current will also be studied.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

ULTIMATE DISPOSAL

12-A

ULTIMATE DISPOSAL

The development of methods for nonpollutional disposal of sludges and concentrated pollutants resulting from treatment processes is critical to a successful water quality improvement program. As higher removal efficiencies become required and new advanced waste treatment processes are applied greater amounts of sludges and brines will be generated. Techniques must be developed to treat these various types of sludges. Over 50% of the treatment costs at municipal waste treatment plants are associated with sludge treatment and disposal. Therefore, least cost treatment methods must be developed if the overall cost of improved treatment is to be kept at reasonable and acceptable operating costs.

The objectives of this research are to develop new or improved sludge disposal technology so that both the municipal and industrial sectors will be able to achieve compliance with present and future water quality standards. Preliminary design manuals on sludge properties, equipment performance will be completed. Processes for stabilization of the new types of sludges generated in the new physical-chemical treatment processes. Develop and demonstrate new radical pretreatment methods where conventional methods are inadequate or expensive. Complete design guidelines for land disposal of sludges. Demonstrate utilization of organic matter in sludge to animal feed. Develop and demonstrate improved processes for sludge incineration, lime recovery, brine disposal and sludge transport systems.

Processes and technology will be developed and demonstrated that have the potential to yield the least cost treatment methods to meet water quality standards for the disposal of sludges from treatment plants. This phase of development and evaluation is necessary before the process is ready for full scale demonstration.

Through an in-house and extramural grants and contract program, new processes and technologies will be developed to accomplish the above stated objectives. State of the art papers will be prepared where necessary. From this, research and development areas are defined, also research needs are continually sought from the Regions and States that also define problems to be solved. Implementation of R&D is carried out by a well developed research work plan with decision points that dictate program direction. Evaluation from bench scale, pilot plant and large scale demonstration determines its applicability to solving the specified problem.

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PPB 17070 - Ultimate Disposal

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*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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FINAL REPORTS AVAILABLE

Report Number	Title/Author	Source
17070---05/68	A Study of Sludge Handling and Disposal; by R. S. Burd, FWPCA, Wash., D.C. (formerly with Dow Chemical Co.)	NTIS - PB 179 514
17070DFK02/70	The Biochemistry of Anaerobic Digestion; by Manhattan College, Bronx, NY	NTIS - PB 198 655
17070DHO02/71	DNA Concentration as an Estimate of Sludge Biomass; by Southwest Missouri State College, Springfield, MO	GPO - 40¢
17070DLV04/70	State of the Art Review on Sludge Incineration Practice; by Resources Engineering Associates, Wilton, Conn.	GPO - $1.25
17070DJW11/69	State of the Art Review on Product Recovery; by Resources Engineering Assoc., Wilton, Connecticut	NTIS - PB 192 634
17070DLY05/70	Disposal of Brines Produced in Renovation of Municipal Wastewater; by Burns & Roe, Inc., Oradell, NJ	GPO - $1.25
17070DUQ07/70	Pipeline Flow of Solids-Liquid Suspensions; by Syracuse Univ., Syracuse, NY	NTIS - PB 199 708
17070DYF09/70	A Study of Sludge Digestion with Sodium Chloride and Sulfate; by Georgia Institute of Technology, Atlanta, GA	NTIS - PB 196 732
17070EBP07/71	Computerized Design and Cost Estimation for Multiple-Hearth Sludge Incinerators; by Rocketdyne Div., No. American Rockwell Corp., Canoga Park, Calif.	(Under review)
17070EHE07/70	Electroosmotic Pumping for Dewatering Sewage Sludge; by Rocketdyne Div. of North American Rockwell Corp., Canoga Park, CA	GPO - 65¢
17070EKN12/69	Feasibility of Hydrolysis of Sludge Using Low Pressure Steam with SO2 as a Hydralytic Adjunct and Utilization of the Resulting Hydrosate; by Foster D. Snell, Inc., Florham Park, NJ	NTIS - PB 194 784
17070ESJ01/70	Ultimate Disposal of Phosphate from Waste Water by Recovery as Fertilizer; by Dearborn Chemical Div., W. R. Grace & Co., Chicago, IL	GPO - 70¢

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DAU

TITLE OF PROJECT: "Aerobic Digestion of Organic Waste Sludge"

GRANTEE OR CONTRACTOR:

Oklahoma State University of
Agriculture and Applied Science
Stillwater, Oklahoma 74074

EPA PROJECT OFFICER:

Dr. R. L. Bunch
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Stillwater, Oklahoma

DESCRIPTION OF PROJECT

Award Date: July 1, 1969 Project Cost: $83,088

Completion Date: August 31, 1971 Federal Cost: $78,909

Summary:

The objective of this project is to determine the usefulness and effectiveness of aerobic sludge digestion as a replacement for anaerobic sludge digestion. The relationship of detention time to the quality of effluent supernatant under field conditions will be determined. The results obtained for aerobic sludge digestion will be compared with the results obtained for the anaerobic sludge digester of the City of Stillwater, Oklahoma. Drainability or filterability of the sludge from the aerobic sludge digesters will be compared with the sludge from the anaerobic sludge digesters. Observations and tests to be made during the pilot plant study include: solids concentrations, percent moisture, odor, ammonia nitrogen, total nitrogen, nitrate and nitritenitrogen, total phosphorous, chemical oxygen demand, occasionally the biochemical oxygen demand, pH, temperature, and sludge filterability. Aeration periods for the sludge will vary from about two to twenty days.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17070 DFK

TITLE OF PROJECT: "The Biochemistry of Anerobic Digestion"

GRANTEE OR CONTRACTOR:
Manhattan College
Bronx, New York 10471

EPA PROJECT OFFICER:
Dr. Robert Bunch
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Bronx, New York

DESCRIPTION OF PROJECT

Award Date: September 1, 1968
Project Cost: $8,619

Completion Date: August 31, 1969
Federal Cost: $8,188

Summary:

The objective of this project was to explore further the basic biochemistry in order to determine the general pathways involved in the anaerobic microbiological breakdown of various pure organic compounds which are constituents of complex wastes. Some of the compounds under study include propionic acid, lactic acid, succinic acid, glutamic acid, glycine, and oleic acid.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 DHO

TITLE OF PROJECT: "Microbiology of Sludge: DNA Analysis and N_2 Removal"

GRANTEE OR CONTRACTOR: Southwest Missouri State College 901 Sough National Springfield, Missouri 65802	EPA PROJECT OFFICER: Dr. Robert L. Bunch Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Springfield, Missouri

DESCRIPTION OF PROJECT

Award Date: July 1, 1969	Project Cost: $17,431
Completion Date: June 31, 1970	Federal Cost: $16,560

Summary:

To investigate the possibility of using DNA concentration as an estimate of the viable bacterial population of activated sludge floc, and to relate the quantity of DNA with the oxygen uptake and the concentration of volatile solids in the floc, and to determine whether microbial denitrification contributes significantly to nitrogen removal in waste treatment at near zero temperatures and at elevated temperatures and to study the relationship between oxygen tension and denitrification at these temperatures.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DIV

TITLE OF PROJECT: "Dewatering and Drying of Sludge on Porous Media"

GRANTEE OR CONTRACTOR:
Vanderbilt University
Nashville, Tennessee 37203

EPA PROJECT OFFICER:
Dr. Robert Dean
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Nashville, Tennessee

DESCRIPTION OF PROJECT

Award Date: September 1, 1968 Project Cost: $16,311

Completion Date: August 31, 1969 Federal Cost: $12,721

Summary:

The research evolves around the determination of moisture gradients and transport rates within the supporting media, the sludge, and the air-vapor boundry layer in the atmosphere. Gamma ray spectroscopy will be used to ascertain the changes in moisture without disturbing the flow system. These measurements will be used to establish the dewatering and drying rate of sludge under various climatic, operating and design conditions.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DJR

TITLE OF PROJECT: "Mechanisms of Sludge Thickening"

GRANTEE OR CONTRACTOR:
University of Illinois
Urbana, Illinois 61801

EPA PROJECT OFFICER:
Dr. James Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Urbana, Illinois

DESCRIPTION OF PROJECT

Award Date: September 1, 1967 Project Cost: $43,145

Completion Date: August 31, 1969 Federal Cost: $38,657

. Summary:

The fundamental mechanisms which control the settling behavior of concentrated sludges are being evaluated. Theories of flow through porous media have been used to analyze observed settling behavior of flocculent sludges. The technique has permitted study of the changes in floc diameter and water content which occur as thickening takes place. In other studies, a coaxial cylinder viscometer has been used to study the rheology of biological sludges and to observe the changes in the physical characteristics of biological sludges effected by changes in environmental conditions such as organic loading intensity. Finally, the thickening characteristics of biological sludges in full scale settling tanks is being studied to permit comparison with observed laboratory results and to permit development of rational criteria for design of sludge thickeners.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 DJV

TITLE OF PROJECT: "Studies on the Methanogenic Bacteria in Sludge"

GRANTEE OR CONTRACTOR:
University of Florida
Gainesville, Florida

EPA PROJECT OFFICER:
Mr. Cecil W. Chambers
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Gainesville, Florida

DESCRIPTION OF PROJECT

Award Date: September 1, 1968

Project Cost: $84,913

Completion Date: May31, 1971

Federal Cost: $56,993

Summary:

The objective of this project is to provide information on the nature and characteristics of the methanogenic bacteria involved in waste treatment processes. Studies on methanogenic bacteria in digesting sludge will be continued with primary emphasis on propionic acid, and palmitic acid metabolizing bacteria. Factors which cause the disruption of anaerobic processes will be examined as they relate to methanogenic bacteria, and the methanogenic bacteria will be examined as possible assay organisms for toxic material.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DJW

TITLE OF PROJECT: "State of the Art Review on Product Recovery"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Resources Engineering Associates, Inc. 970 Summer Street Stamford, Connecticut 06902	Mr. B. V. Salotto Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Stamford, Connecticut

DESCRIPTION OF PROJECT

Award Date:	February 20, 1969	Project Cost:	$9,500
Completion Date:	October 20, 1969	Federal Cost:	$9,500

Summary:

The objective of this contract is to review the present state of the art on product recovery as an ultimate disposal method and to project the possible applications of this method into the future.

The review and evaluation will present an industry and technique (process) evaluation of the previous and currently practiced research, development and operating experience.

A critical review of product market development and recovery economics will be made. Where possible, alternative treatment techniques, their economids and environmental impact will be presented. A determination will be made between recovered products for direct use and recovered products for re-sale to the open market. An evaluation will be made of some of the market problems which confront a seller having no knowledge of the market ability of a recovered product for re-sale.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DKA

TITLE OF PROJECT: "Treatment Processes--Wastes Pumped from Septic Tanks"

GRANTEE OR CONTRACTOR:
The University of Connecticut
Storrs, Connecticut 06268

EPA PROJECT OFFICER:
Mr. G. Kenneth Dotson
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Storrs, Connecticut

DESCRIPTION OF PROJECT

Award Date: June 1, 1969

Completion Date: May 31, 1972

Project Cost: $256,792

Federal Cost: $230,441

Summary:

The objectives for third year of this project are:

(1) To develop recommendations for the handling and pre-treatment of septic tank wastes in areas where sewage treatment plant facilities are available.

(2) To develop method(s)/system(s) for treatment of wastes pumped from septic tanks for small communities (i.e., areas in which conventional treatment plants are not available for disposal of these wastes), and to determine the best point(s) of waste introduction into existing sewage treatment plant processes and what, if any, preparatory treatment is desirable.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 , *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 DLV (14-12-499)

TITLE OF PROJECT: "State of the Art Review on Sludge Incineration Practice"

GRANTEE OR CONTRACTOR:
Resource Engineering Associates, Inc.
Stamford, Connecticut 06902

EPA PROJECT OFFICER:
Mr. B. V. Salotto
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Stamford, Connecticut

DESCRIPTION OF PROJECT

Award Date:	March 7, 1969	Project Cost:	$6,576
Completion Date:	November 7, 1969	Federal Cost:	$6,576

. Summary:

The objective of this contract is to review the present state of the art on sludge incineration as an ultimate disposal method.

This review will bring together the available data on the operation and cost of sludge incineration including an analysis of the effect of incineration on other resource management problems. In addition, a study of the necessary pretreatment steps, their costs and operational aspects, will be included. The study will also include an appraisal of the impact of varying waste characteristics on incineration and pretreatment operations.

The final result of this study will be a report containing the current status and cost of sludge incineration.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 DLY

TITLE OF PROJECT: "Ultimate Disposal of Brines from Advanced Waste Treatment Processes"

GRANTEE OR CONTRACTOR:
Burns and Roe, Inc.
700 Kinderkamack Road
Oradell, New Jersey 07649

EPA PROJECT OFFICER:
Dr. J. B. Farrell
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Oradell, New Jersey

DESCRIPTION OF PROJECT

Award Date: February 25, 1969 Project Cost: $80,204

Completion Date: April 21, 1971 Federal Cost: $80,204

Summary:

The objective of this contract is to identify the minimum cost methods of disposing of brine concentrates from Advanced Waste Treatment methods such as reverse osmosis and electrodialysis. Costs will be determined as a function of the quantity of brine to be disposed of at three sites in the United States.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DRP (14-12-569)

TITLE OF PROJECT: "Development of Techniques for Estimating the Bacterial Population of Sewage Sludge"

GRANTEE OR CONTRACTOR:
Midwest Research Institute
425 Volkee Boulevard
Kansas City, Missouri 64110

EPA PROJECT OFFICER:
Mr. Cecil W. Chambers
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Kansas City, Missouri

DESCRIPTION OF PROJECT

Award Date:	June 19, 1969	Project Cost:	$116,600
Completion Date:	December 31, 1970	Federal Cost:	$116,600

Summary:

To develop a bacteriological count method whereby the numbers of bacteria in the total biomass of digesting sludge can be related to the efficiency of the degestion process. The practical utility of such a method is to provide a means for determining the onset of any undesirable shift in the population of anaerobic bacteria, particularly the methane producing bacteria, that can serve as a warning of impending problems in a digester.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DUQ

TITLE OF PROJECT: "Pipeline Flow of Solids-Liquid Suspensions"

GRANTEE OR CONTRACTOR:
Syracuse University Research Institute
201 Marshall Street
Syracuse, New York 13210

EPA PROJECT OFFICER:
Dr. J. B. Farrell
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Syracuse University, New York

DESCRIPTION OF PROJECT

Award Date: March 1, 1969
Project Cost: $21,189

Completion Date: February 28, 1970
Federal Cost: $19,205

Summary:

The primary objective of the proposed research is to assess the effect of suspending medium characteristics and suspended solids properties on:

(1) The steady state pipe flow behavior of the suspension
(2) Pressure losses and other problems associated with the flow through pipe bends or other disturbances in the flow path
(3) Problems arising from sudden stopage and subsequent start up of the flow

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DYF

TITLE OF PROJECT: "Digestion of Sludges with Sodium Chloride and Sulfate"

GRANTEE OR CONTRACTOR:
Georgia Institute of Technology
Atlanta, Georgia 30332

EPA PROJECT OFFICER:
Dr. Robert L. Bunch
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Atlanta, Georgia

DESCRIPTION OF PROJECT

Award Date: June 1, 1969

Project Cost: $23,123

Completion Date: April 30, 1970

Federal Cost: $21,967

Summary:

The primary objective of the project is the determination of the cause of sludge digestion failure in the presence of industrial wastes containing several salts at critical concentrations. If sodium chloride plus sodium sulfide are synergistically toxic then a search will be made to find an economical solution to the sludge dispersal problem.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 DZS

TITLE OF PROJECT: "Source Control of Water Treatment Waste Solids"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of Massachusetts Amherst, Massachusetts 01002	Dr. James E. Smith Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Amherst, Massachusetts

DESCRIPTION OF PROJECT

Award Date:	July 1, 1969	Project Cost:	$66,165
Completion Date:	June 30, 1971	Federal Cost:	$60,177

Summary:

The research is for the purpose of finding solutions to the sludge handling problem. Solutions will be obtained by optimizing the design of sludge dewatering and drying beds. In order to optimize the design of these facilities additional research will be carried out on the sludge dewatering process, the sludge drying process and the synthesis of dewatering and drying into economic designs.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 EBP (14-12-547)

TITLE OF PROJECT: Develop a Computer Program for Costs and Performance of Sewage Sludge Incineration Using Multiple Hearth Furnaces

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Rocketdyne Division North American Rockwell Corporation 6633 Canoga Avenue Canoga Park, California 91504	Dr. J. B. Farrell National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Canoga Park, California

DESCRIPTION OF PROJECT

Award Date: October 16, 1970 Project Cost: $127,647

Completion Date: November 28, 1970 Federal Cost: $127,647

Summary:

The purpose of this project is to develop a mathematical design procedure for multiple hearth furnaces for use in incineration of sewage sludge. A digital computer subroutine that is compatible with the FWPCA Executive Program described in Report WP 20-14 will be prepared for the design and total cost estimation of multiple hearth sludge incinerators. This program will permit incineration costs to be included in the current studies of all phases of treatment costs.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 EHB

TITLE OF PROJECT: "Brine Disposal Design Methodology for Advanced Waste Treatment"

GRANTEE OR CONTRACTOR:
New Mexico State University
Box 3449
Las Cruces, New Mexico 88001

EPA PROJECT OFFICER:
Dr. J. B. Farrell
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Las Cruces, New Mexico

DESCRIPTION OF PROJECT

Award Date: November 1, 1969 Project Cost: $27,990

Completion Date: April 30, 1970 Federal Cost: $26,590

Summary:

1. To estimate the reasonable limits of accuracy which are required in procedures for predicting brine vaporation rates.
2. To determine the effect of the nature and concentration of advanced waste treatment brines on evaporation rate and pond design.
3. To optimize the size and number of ponds for effective disposal.
4. To elucidate and evaluate the methods of brine vaporation rate prediction, estimate their accuracies, and recommend the need for further refinement of predictive methods.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 EHE (14-12-568)

TITLE OF PROJECT: "Investigation of Electro-Osmosis as a Technique for Sewage Sludge Dewatering"

GRANTEE OR CONTRACTOR:
Rocketdyne
6633 Canoga Avenue
Canoga Park, California 91304

EPA PROJECT OFFICER:
Dr. Robert B. Dean
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Canoga Park, California

DESCRIPTION OF PROJECT

Award Date: June 24, 1969
Project Cost: $79,966

Completion Date: July 24, 1970
Federal Cost: $79,966

Summary:

To conduct a follow-on investigation to contract No. 14-12-406 which will provide design criteria for a demonstration electroosmotic pump. The immediate objectives will include assessment and selection of appropriate electrode materials, definition of optimum pump configurations, and assessment of the practicality of electroosmotic pumping as a dewatering method supplementary to some predewatering technique.

Life tests of various materials appropriate for use as electrodes will be conducted. Pump configuration experiments will be carried out with the purpose of reducing the potential capital cost of electroosmotic pumping equipment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 EOG

TITLE OF PROJECT: "Sludge Treatment Pilot Plant"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
District of Columbia Department of Sanitary Engineering Washington, D. C. 20004	Mr. D. F. Bishop Washington Pilot Plant 5000 Overlook Avenue, S. W. Washington, D. C. 20032

Project Site: Washington, D. C.

DESCRIPTION OF PROJECT

Award Date:	July 1, 1969	Project Cost:	$761,782
Completion Date:	February 1, 1973	Federal Cost:	$568,379

Summary:

It is the objective of this project to design, construct, and operate a solids processing pilot plant which when operated in conjunction with the existing biological and tertiary pilot plants will produce a closed loop system. Because of the effect of returning supernatants generated in solids processing and the importance of chemical recovery to the economics of tertiary treatment, the proposed sludge processing pilot plant is essential to complement the cost-performance data being obtained in the secondary and tertiary pilot plants.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 EPR (14-12-805)

TITLE OF PROJECT: "Operation and Experimental Program at the Morgantown, West Virginia Sludge Slurry Pilot Plant"

GRANTEE OR CONTRACTOR:

Engineering Science, Inc.
150 East Foothill Boulevard
Arcadia, California 91006

EPA PROJECT OFFICER:

Dr. J. B. Farrell
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Morgantown, West Virginia

DESCRIPTION OF PROJECT

Award Date:	August 22, 1969	Project Cost:	$257,619
Completion Date:	May 31, 1972	Federal Cost:	$257,619

Summary:

The objective of this contract is to demonstrate the feasibility of the use of small diameter pipelines for sludge transport, with particular emphasis on the applicability of the concept to smaller communities. A secondary goal is to demonstrate the feasibility of rejuvenating strip mine spoil with digested sludge while incurring a minimum nuisance and pollution hazard.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 EQX (14-12-822)

TITLE OF PROJECT: "Availability Performance Characteristics, Costs and Functional Designs of Equipment and Machinery for Disposal of Sludges and Other Organic Wastes on Soils"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Ohio Agricultural Research and Development Center Wooster, Ohio 44691	Mr. G. Kenneth Dotson Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Wooster, Ohio

DESCRIPTION OF PROJECT

Award Date: January 29, 1970 Project Cost: $22,179

Completion Date: February 1, 1971 Federal Cost: $22,179

Summary:

The objectives of this project is a study of the existing equipment and machinery used in land disposal of sludges by soliciting information from manufacturers, interviewing the design engineers and observing performance of the equipment. A handbook will be developed that will contain performance characteristics, other design data and costs for each piece of equipment that is found suitable for use in application and management of sludge on soil. Recommended functional designs for new equipment will be made.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 EQY (14-12-824)

TITLE OF PROJECT: "Microbiology of Sewage Sludge Disposal in Soil"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Department of Agronomy Ohio Agricultural Research and Development Center Wooster, Ohio 44691	Mr. Ken Dotson Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Wooster, Ohio

DESCRIPTION OF PROJECT

Award Date:	February 16, 1970	Project Cost:	$56,289
Completion Date:	February 16, 1972	Federal Cost:	$56,289

Summary:

The purpose of this research is to determine ways to get the most value out of organic sludge applied to the land while reducing unwanted side effects. Sludge contains large numbers of microbes and is transformed into good earth by the actions of both these and the native soil microbes. This research will determine the environmental factors which will allow optimal microbial activity in soils treated with sewage sludge while reducing unwanted effects from microbial activity.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17070 EVY (14-12-427)

TITLE OF PROJECT: "Biological Methods of Sludge Dewatering"

GRANTEE OR CONTRACTOR:

Aerojet-General Corporation
9200 East Flair Drive
El Monte, California 91734

Project Site: El Monte, Calif.

EPA PROJECT OFFICER:

Dr. Robert B. Dean
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 8, 1970

Completion Date: June 5, 1971

Project Cost: $91,487

Federal Cost: $91,487

Summary:

The objective of this project is to determine whether an enzyme system can be used to improve the dewatering of biological sludges. The necessary enzymes could be obtained from an external source or could be produced from the organisms in a portion of the sludge by change of their environment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 FIR (68-01-0005)

TITLE OF PROJECT: Pre-Concentration of Brines in Evaporation Cells as an Adjunct to Solar Evaporation Ponds

GRANTEE OR CONTRACTOR:

The Veracity Corporation
Box 717
Glen Echo, Maryland 20768

Project Site: Glen Echo, Maryland

EPA PROJECT OFFICER:

Dr. J. B. Farrell
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: December 31, 1970

Completion Date: April 30, 1972

Project Cost: $43,000

Federal Cost: $43,000

Summary:

The purpose of this project is to develop a new concept for disposing of brines from advanced waste treatment processes. This study will consider various mechanically-produced-draft cooling or spray cell designs and choose an optimum design. Performance and cost estimates will be designed and cost-estimated for three specific sites, tentatively established as Denver, El Paso, and Akron. These costs will be compared with costs developed in an earlier FWQA study for brine evaporation in lined ponds.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 FMJ (14-12-813)

TITLE OF PROJECT: Conditioning of Wastewater Sludges Using SO_2 and Low Pressure Steam

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Foster D. Snell, Inc. Hanover Road Florham Park, New Jersey 07932	Dr. Joseph B. Farrell National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Florham Park, New Jersey

DESCRIPTION OF PROJECT

Award Date:	December 3, 1969	Project Cost:	$133,898
Completion Date:	June 1, 1972	Federal Cost:	$133,898

Summary:

The first objective of this study is to evaluate at pilot scale the utility of a sludge hydrolysis process developed under prior contracts to improve filterability of the solid fraction of sludge. The second objective considers the possibility of using certain fractions of the sludge as an animal feed supplement. Lime precipitate and concentrate from the liquid fraction of hydrolyzed sludge will be fed to animals to measure any deleterious effects.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 FOC

TITLE OF PROJECT: "Spray Irrigation Sewage Oxidation Pond Effluent"

GRANTEE OR CONTRACTOR: City of Belding City Hall Belding, Michigan 48809	EPA PROJECT OFFICER: Mr. Ralph G. Christensen EPA, Region V 1 N. W. Wacker Drive Chicago, Illinois 60606

Project Site: Belding, Michigan

DESCRIPTION OF PROJECT

Award Date: April 1, 1970	Project Cost: $211,150
Completion Date: March 31, 1973	Federal Cost: $136,700

Summary:

The objective of this project is to demonstrate the feasibility of spray irrigation of chlorinated sewage oxidation pond effluent utilizing the "living filter concept;" to develop design parameters for irrigation on glacial soils; and to demonstrate conservation of resources by using nutrients in the tree nursery and sod farm for municipal needs. The plan of operation is to irrigate under controlled conditions during the growing season, using up to fifty percent of the community's waste water, the balance of the flow being discharged to the Flat River.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 (Demonstration) *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 GOS

TITLE OF PROJECT: "Recycling of Wastewater, Stratford, New Hampshire"

GRANTEE OR CONTRACTOR:

Town of Stratford
North Stratford,
New Hampshire 03590

EPA PROJECT OFFICER:
Dr. Hend Gorchev
Region I
Room 2303 John F. Kennedy Bldg.
Boston, Massachusetts 02203

Project Site: Town of Stratford, New Hampshire

DESCRIPTION OF PROJECT

Award Date: June 14, 1971

Project Cost: $38,100

Completion Date: June 30, 1972

Federal Cost: $30,600

Summary:

The objectives of this project are:

(1) To determine the effectiveness of organic solid wastes as neutralizing medium for sewage, and to determine effectiveness of composting as destructive mechanism for pathogens, in a situation which commonly occurs in small-to-medium size towns associated with wood-using industries.

(2) To study composting as a single process for disposal of all bio-degradable wastes as a means of total avoidance of discharge of effluent into streams.

(3) To determine the effectiveness of a system using all flowable sewage of a community (other than storm water), thus totally avoiding discharge into streams or ground water, by using sewage as a compost medium for available bio-degradable wastes.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17070 HCZ

TITLE OF PROJECT: "Novel Methods of Sludge Dewatering"

GRANTEE OR CONTRACTOR:

Westinghouse Research Laboratories
Pittsburgh, Pennsylvania

EPA PROJECT OFFICER:

Dr. James Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Pittsburgh, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: April 1, 1971

Completion Date: October 1, 1972

Project Cost: $163,445

Federal Cost: $163,445

Summary:

This project encompases both an analytical and experimental treatment of dewatering of activated sludge by capillary action. The first phase of the program would involve selecting appropriate porous media to serve as the capillary reservoir. The porous media would be optimized with respect to the physical parameters as identified from the analytical model. The second phase will be directed toward determining the specific operations necessary to incorporate the capillary dewatering concept into a functioning unit for treatment of waste activated sludge. The third phase is to design, construct, and demonstrate a capillary dewatering unit whose operational functions and specific embodiment have been tailored for dewatering waste activated and primary sludges.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17070 HDA (68-01-0095)

TITLE OF PROJECT: Optimization and Design Criteria of an Oil Activated Sludge Concentration Process

GRANTEE OR CONTRACTOR:

Esso Research and Engineering Co.
P. O. Box 8
Linden, New Jersey 07036

Project Site: Linden, New Jersey

EPA PROJECT OFFICER:

Dr. J. B. Farrell
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 23, 1971

Completion Date: June 22, 1972

Project Cost: $80,420

Federal Cost: $80,420

Summary:

This project is for the optimization and design criteria of a process that consists of combining a unique oil activated sludge dewatering technique with a multiple effect evaporative sludge drying system. The process would pre-concentrate a sludge feed by mixing with oil (or oil-plus surfactant) to a specified level; the multiple effect evaporative sludge drying system would complete the dewatering and dispose of the sludge by incineration.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: CI-72-0052

TITLE OF PROJECT: "Experimental Investigation of the Aerobic Stabilization of Sludges"

GRANTEE OR CONTRACTOR:

Metropolitan Denver Sewage
Disposal District No. 1
Denver, Colorado

Project Site: Denver, Colorado

EPA PROJECT OFFICER:
Dr. James Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 1972

Completion Date: June 1973

Project Cost: $81,798

Federal Cost: $81,798

Summary:

The information obtained from this work will provide complete information on the aerobic stabilization process. To be investigated include (1) the time of stabilization, (2) the process loading, (3) the amount of air or oxygen supplied, and (4) the percent of primary and secondary sludge that is mixed. Consideration will be given to batch, continuous, one, two-stage, and multi-stage operation. This work will be done under pilot and plant scale operation.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: S-801871

TITLE OF PROJECT: "Wastewater Solids Utilization on the Land"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
	Mr. Rocco Ricci
Ocean County Sewerage Authority	EPA, Region II
Ocean County, New Jersey	26 Federal Plaza
	Room 847
	New York, New York 10007

Project Site: Ocean County, New Jersey

DESCRIPTION OF PROJECT

Award Date: June 1972

Project Cost: $993,000

Completion Date: June 1975

Federal Cost: $200,000

Summary:

The work proposes to demonstrate the feasibility of disposing of sewage sludge by applying it to soils that are typical of many found along the East Coast. Improvement of low quality land without detrimental environmental impact will be demonstrated. Application techniques and rates compatible with the environment and the constraints imposed by sludge properties will be determined. Extensive ground water quality studies are to precede the sludge application and are to be run during sludge spreading.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY

RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: CI-72-0023

TITLE OF PROJECT: "Critical Review of Experience with Land Spreading of Liquid Sewage Sludge"

GRANTEE OR CONTRACTOR:

Battelle-Columbus
505 King Avenue
Columbus, Ohio 43201

EPA PROJECT OFFICER:
Mr. G. Kenneth Dotson
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Columbus, Ohio

DESCRIPTION OF PROJECT

Award Date:	June 1, 1972	Project Cost:	$55,378
Completion Date:	June 1, 1973	Federal Cost:	$55,378

Summary:

A critical review will be made of results from existing examples of landspreading of liquid sewage sludge to provide data needed for proper design of land spreading systems and to identify deficiencies where additional studies are needed.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 801455

TITLE OF PROJECT: "Combined Sludge Processing Project"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Central Contra Costa Sanitary District Walnut Creek, California	Dr. Robert Dean Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Contra Costa, California

DESCRIPTION OF PROJECT

Award Date: June 1, 1972 Project Cost: $45,460

Completion Date: December 1, 1972 Federal Cost: $15,000

Summary:

CCCSD has built an Advanced Treatment Test Facility (ATTF) to treat raw sewage with lime followed by biological nitrification and denitrification at up to 2.5 MGD. The excess lime sludge is dewatered in a pair of centrifuges operated in series to separate calcium carbonate from calcium phosphate organic matter and inerts. Calcium carbonate is to be converted to recovered lime in one set of multiple hearth furnaces and the residual sludge will be incinerated in another set of furnaces.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: CI-72-0024

TITLE OF PROJECT: "Improved Gravity Thickening of Wastewater Sludges"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
RP Industries 344 Boston Post Road Marlboro, Massachusetts 01752	Dr. James Smith Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268
Project Site: Marlboro, Mass.	

DESCRIPTION OF PROJECT

Award Date: June 1972	Project Cost: $75,913
Completion Date: September 1973	Federal Cost: $75,913

Summary:

The purpose of this work is to develop and demonstrate improved methods for thickening wastewater sludges. Present thickening devices frequently produce thickened activated sludge having less than 3% solids, whereas the theoretical upper limit is much greater. Substantial improvements in thickening devices will take the form of novel design; a magnetic separation of solids and water. The feasibility of this method will be demonstrated.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

WASTEWATER RENOVATION
AND REUSE

13.A

WASTEWATER RENOVATION AND REUSE

As available water supplies dwindle and water quality standards become more stringent, reuse of municipal wastewater for diverse purposes becomes more compelling. Sale of the reused water may offset some of the treatment costs and total reuse will allow no discharge of effluents into surrounding waters.

The objectives of this research program are to develop process systems for the effective and economical treatment of municipal wastes for total reuse. Specific objectives will include:

(1) Prepare state-of-the-art survey of all types of municipal wastewater reuse.

(2) Develop technology for water reuse for irrigation purposes.

(3) Develop technology for water reuse for industrial purposes.

(4) Develop technology for water reuse for non-potable domestic uses.

(5) Develop technology for water reuse for potable purposes.

Through an in-house and extramural grants and contract program, new processes and technologies will be developed to accomplish the above stated objectives. State-of-the-art papers will be prepared where necessary. Research and development areas are defined. Implementation of R&D is carried out according to a well developed work plan with decision points that dictate program direction. Evaluation of bench scale, pilot plant and large scale demonstration projects determines its technical and economic applicability to solving the specified problem.

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PPB 17080 - Wastewater Renovation and Reuse

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*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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FINAL REPORTS AVAILABLE

Report Number	Title/Author	Source
17080DAR09/71	Optimization of Ammonia Removal by Ion Exchange Using Clinoptilolite (Part I); by Sanitary Engineering Research Lab., College of Engineering, and School of Public Health, Univ. of Calif., Berkeley, CA	(Under review)

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 DAR

TITLE OF PROJECT: "Chemical Processing of Primary Organic Waste Streams"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
University of California Berkeley, California 94720	Mr. Warren Schwartz Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Berkeley, California

DESCRIPTION OF PROJECT

Award Date: March 24, 1970	Project Cost: $68,434
Completion Date: May 11, 1971	Federal Cost: $57,706

Summary:

This project will investigate various chemical processes for the renovation of domestic waste waters to a level of quality meeting potable water requirements. The processes to be studied include coagulation-flocculation with alum and polyelectrolytes, precipitation with lime, sorption by weak base synthetic resins and activated carbon, and high-rate dual media filtration. Special attention will be given to optimization of the coagulation-flocculation process by dispersion mixing and controlled mixing energies and to the improvement of the operating cycle of selected sorptive resins. Very short duration aeration with solids recycle will be studied as a means of removing low molecular weight organics while sorption on aluminum and calcium precipitates and resins will be investigated for removing the high molecular weight, colloidal, and particulate organics. Attention will also be given to the chemical nature and biological significance of the residual organics from the various process stages.

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 DGC

TITLE OF PROJECT: "Municipal Sewage Effluent Reclamation by Percolation with High Ground Water Conditions"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Lompoc 119 West Walnut Avenue Lompoc, California 93436	Mr. John J. White EPA, Region IX 100 California Street San Francisco, California 94111

Project Site: Lompoc, California

DESCRIPTION OF PROJECT

Award Date:	March 24, 1969	Project Cost:	$134,040
Completion Date:	December 31, 1973	Federal Cost:	$ 91,030

Summary:

The objective of this project is to remove suspended solids and decreased coliform content in sewage treatment plant effluent by intermittent operation of percolation basins. These percolation basins overlie a high ground water area which may contain some expanding soil particles.

It is planned to rapidly flood four ½ acre basins to 0.5' once daily to demonstrate the practicability of effluent percolation. If it proves to be practicable, they will increase the ponding depth to demonstrate the resulting variations in the quality of operation and the percolation rate. After ascertaining the best results, the number of basins will be tripled.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 DIQ (14-12-857)

TITLE OF PROJECT: "A Study of Costs for Reusing Municipal Waste Return Flows in Selected Texas Cities"

GRANTEE OR CONTRACTOR:
Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

EPA PROJECT OFFICER:
Mr. Robert Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Austin, Texas

DESCRIPTION OF PROJECT

Award Date: April 22, 1970

Completion Date: February 22, 1971

Project Cost: $49,992

Federal Cost: $20,000 OSW
$29,992 EPA

Summary:

To study the pollution abatement and water reuse needs of five cities in Texas in order to identify the most practicable and economic solution for each city. Consideration would be given to blending renovated wastewater with brackish water and water from other sources.

The five cities to be studied are El Paso, Midland, San Angelo, San Antonio, and Corpus Christi. For each of these five cities the Contractor will evaluate the following:

(1) All feasible and demonstrated physical, chemical, or biological processes or groups of processes for treating municipal wastewater for reuse. This includes demineralization processes.

(2) All feasible and demonstrated methods for desalting brackish or seawater for blending with municipal wastewater.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17080 DJE

TITLE OF PROJECT: "Tertiary Treatment of Sewage Plant Effluent and Reuse for Power Plant Supply and Irrigation"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Colorado Springs 18 South Nevada Avenue Colorado Springs, Colorado 80902	Dr. Carl Brunner Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Colorado Springs, Colorado

DESCRIPTION OF PROJECT

Award Date:	June 27, 1968	Project Cost:	$1,191,092
Completion Date:	June 30, 1972	Federal Cost:	$ 595,546

Summary:

The project objectives are to demonstrate the feasibility and the utility of reused water renovated from a biofiltration plant for such uses as irrigation and power plant cooling water. With the reuse of 2 MGD of water that has been renovated for cooling water by lime precipitation and granular carbon processes and with the reuse of 8 MGD of water that has been renovated for irrigation by high rate multi-media filtration, coarse sand filtration and chlorination the total quantity of organic matter, phosphates and other nutrients which enter the receiving waters will be demonstrated to be significantly reduced. Evaluations on the over-all economics of the project will be delineated. Technical and economic information will be compiled on each individual process. Public acceptance of reuse will also be evaluated. The effluent quality from the processes incorporated in this project are realistic and meet the recommendations of the National Advisory Committee to the FWPCA on industrial water supplies.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 DOI

TITLE OF PROJECT: "Evaluation of Treatment for Urban Wastewater Reuse"

GRANTEE OR CONTRACTOR:
University of Colorado
Boulder, Colorado 80302

EPA PROJECT OFFICER:
Mr. Edwin L. Barth
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Boulder, Colorado

DESCRIPTION OF PROJECT

Award Date: July 1, 1969

Completion Date: June 30, 1972

Project Cost: $80,509

Federal Cost: $71,687

Summary:

To develop a pilot scale advanced wastewater treatment system and to evaluate the technical feasibility of the system for renovating secondary effluent from the Metro Denver activated sludge sewage treatment plant. The pilot plant will include the following series of unit processes: biological nitrification, coagulation-sedimentation, and sand filtration. Laboratory analyses will be made to assess the plant effectiveness in treating the wastewater, to evaluate the operational problems involved, and to establish design parameters for efficiently reclaiming the indicated wastewater. The data will be useful in determining possible economic uses for the reclaimed water.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 DPQ

TITLE OF PROJECT: "An Economic Study On Combining Desalting and Waste Water Purification Facilities"

GRANTEE OR CONTRACTOR:
Bechtel Corporation
50 Beale Street
San Francisco, California 95119

EPA PROJECT OFFICER:
Dr. Carl Brunner
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: San Francisco, California

DESCRIPTION OF PROJECT

Award Date: March 17, 1969

Project Cost: $38,000

Completion Date: October 17, 1969

Federal Cost: $38,000

Summary:

The objective of this project is to prepare a preliminary evaluation of the feasibility and cost of providing additional water supplies to United States coastal cities through integrated application of seawater desalting and wastewater renovation technology.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 DUU

TITLE OF PROJECT: "Mass Transfer Analysis in Reverse Osmosis Operation"

GRANTEE OR CONTRACTOR:
Syracuse University
Syracuse, New York 13210

EPA PROJECT OFFICER:
Mr. Robert Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Syracuse, New York

DESCRIPTION OF PROJECT

Award Date: July 1, 1969

Project Cost: $24,804

Completion Date: June 30, 1970

Federal Cost: $21,983

Summary:

The main objectives of this work are:

(1) To obtain analytical expressions for the rate of production of pure water from waste water by reverse osmosis operation in terms of operating variables under turbulent flow conditions.
(2) To study the effect of natural convection on a reverse osmosis system.
(3) To determine the most promising geometrical configurations of the system and the most optimal operating conditions.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 & 6a2 , *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17080 EDE (14-12-150)

TITLE OF PROJECT: "Pomona Research and Development Facility"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Los Angeles County Sanitation District No. 2 2020 Beverly Boulevard Los Angeles, California 90057	Mr. A. N. Masse Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Pomona, California

DESCRIPTION OF PROJECT

Award Date:	June 20, 1967	Project Cost:	$594,416
Completion Date:	August 31, 1970	Federal Cost:	$594,416

Summary:

The objectives of this contract are to allow continuation of studies in order to define cost estimates and operating parameters of the various advanced waste treatment processes under study.

The pilot plant located at the site of the Pomona, California, Water Renovation Plant has been investigating the advanced waste treatment process since 1964. Investigation of some processes has been continued and others started as the need warranted. Investigations are continuing on adsorption on gradular carbon, denitrification of carbon and sand, reverse osmosis and ion exchange, among others.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 17080 EDW

TITLE OF PROJECT: "Tertiary Sewage Treatment for Reuse"

GRANTEE OR CONTRACTOR:

Irvine Water District
Irvine, California

EPA PROJECT OFFICER:
Mr. Gerald Stern
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Irvine, California

DESCRIPTION OF PROJECT

Award Date: October 1, 1970

Project Cost: $465,000

Completion Date: September 1, 1972

Federal Cost: $325,000

Summary:

To demonstrate a complete tertiary sewage treatment system expected to provide a final effluent which will meet U.S. Public Health Service Drinking Water Standards and can therefore be fully utilized in the District's water reclamation and reuse plan. The demonstration is expected to illustrate a novel method of phosphate removal through sludge concentration and chemical addition, an increased organic loading rate to the existing aeration units, and the removal of tastes, colors, turbidity, odors, and ABS with adsorption in carbon contactors. It is also expected to illustrate the removal of viruses with chemical addition and filtration and a high rate of nitrogen removal through the addition of pure organics in the carbon adsorption units.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 EKG, I

TITLE OF PROJECT: "A Complete Recycle Wastewater Treatment Plant"

GRANTEE OR CONTRACTOR:

City of Dallas
Dallas, Texas

EPA PROJECT OFFICER:
Mr. Richard Brenner
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Dallas, Texas

DESCRIPTION OF PROJECT

Award Date: December 1, 1966

Project Cost: $797,000

Completion Date: December 1, 1969

Federal Cost: $510,000

Summary:

The objective of this project is to determine the best wastewater treatment process to produce an effluent having the quality required for discharge into a river which, generally, has a flow made up of treated wastewater only.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 EKG, II

TITLE OF PROJECT: "Removal of Heavy Metals by Wastewater Treatment Processes"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Dallas Dallas, Texas	Dr. Carl Brunner Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Dallas, Texas

DESCRIPTION OF PROJECT

Award Date: February 1, 1972 Project Cost: $200,287

Completion Date: January 31, 1973 Federal Cost: $118,166

Summary:

Removal of heavy metals such as Ag, Cd, Cr, Cu, Fe, Mn, Ni, Pb, Zn, Ba, Se, Hg, Co, Mo, As, and B by select waste treatment processes will be examined. Raw wastewater will be characterized for heavy metals content. The fate of these heavy metals will be determined as the wastewater is treated using a combination of the following processes: activated sludge, dual media filtration, carbon adsorption, chemical treatment, and chlorination.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 FAB

TITLE OF PROJECT: "Tertiary Treatment of Sewage Plant Effluent and Reuse - Pikes Peak"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
City of Colorado Springs 18 South Nevada Avenue Colorado Springs, Colorado	Mr. Warren Schwartz Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Pikes Peak, Colorado

DESCRIPTION OF PROJECT

Award Date:	June 1, 1968	Project Cost:	$63,052
Completion Date:	June 30, 1971	Federal Cost:	$47,289

Summary:

The objective of the grant is to demonstrate one means of waste treatment at high altitudes, and to determine feasibility of water reuse for non-potable purposes. Reduction in pollution of surface water supplies obtained at lower elevations, and cost of present water supply are other important objectives. Potable water would still be hauled in, as at present, and would provide for makeup water to prevent buildup of dissolved solids in the non-potable system.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 FAF

TITLE OF PROJECT: "Advanced Waste Treatment for Water Reclamation and Reuse by Injection"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
County of Nassau Mineola, New York	Dr. Irwin Kugelman Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Mineola, New York

DESCRIPTION OF PROJECT

Award Date:	December 1, 1966	Project Cost:	$1,853,200
Completion Date:	June 30, 1972	Federal Cost:	$ 700,000

Summary:

The objective of the project is to conduct studies of advanced waste treatment processes and to demonstrate that the reclaimed secondary effluent is suitable for reuse and injection into underground aquifers. The project will provide operating data on advanced waste treatment processes and allow optimizing the economics of the process. It will also demonstrate the effectiveness and reliability of advanced waste treatment as a method of providing water for reuse from secondary treatment plant effluent.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 FRE

TITLE OF PROJECT: "An Integrated Biological, Physical and Chemical Wastewater Treatment Facility for Water Reclamation"

GRANTEE OR CONTRACTOR:
City of Hobbs, New Mexico
P. O. Box 1117
Hobbs, New Mexico 88240

EPA PROJECT OFFICER:
Dr. Edwin F. Barth
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Hobbs, New Mexico

DESCRIPTION OF PROJECT

Award Date: July 1, 1971

Project Cost: $724,000

Completion Date: June 30, 1974

Federal Cost: $543,000

Summary:

The objective of this project is to demonstrate the feasibility of producing a hygienically acceptable water in a semi-arid climate by providing an integrated biological, physical, and chemical wastewater treatment system specifically designed to enhance nutrient removal and scavenge other trace pollutants. This project includes a biological system especially designed to maximize nitrogen and phosphorus removal while providing additional tertiary processes necessary to remove other refractory contaminants. Ultimate discharge will be to a recreational lake for ground water recharge. Support is for post-construction studies and reports, and operation and maintenance activities for two years of operation. Operation of the treatment facility will commence about July 1, 1972.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 6a2 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 FSF

TITLE OF PROJECT: "Central Contra Costa County Water Renovation Project"

GRANTEE OR CONTRACTOR:
Central Contra Costa Sanitary District
Walnut Creek, California AND
The Contra Costa County Water District
Concord, California

EPA PROJECT OFFICER:
Dr. Carl A. Brunner
Advanced Waste Treatment Research Lab.
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Walnut Creek, California

DESCRIPTION OF PROJECT

Award Date: February 2, 1970 Project Cost: $431,337

Completion Date: June 30, 1972 Federal Cost: $322,250

Summary:

The objectives of this project are one pilot scale program in which various wastewater treatment process sequences will be used to: 1) Allow investigation of the removal of various impurities in wastewaters by physical-chemical and biological treatment processes; 2) Produce various grades of renovated waters whose properties will be tested for factors of importance in industrial water use; and 3) Provide process data which, along with other available information, will be used in order-of-magnitude cost comparisons of various water renovation processes.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17080 GCI

TITLE OF PROJECT: "Water Reclamation Project for Antelope Valley"

GRANTEE OR CONTRACTOR:
Los Angeles County Board of Supervisors
108 West Second Street
Los Angeles, California 90012

EPA PROJECT OFFICER:
Mr. Gerald Stern
Advanced Waste Treatment Research Lab.
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Los Angeles, California

DESCRIPTION OF PROJECT

Award Date: August 1, 1970
Project Cost: $181,760

Completion Date: June 30, 1971
Federal Cost: $ 90,000

Summary:

The objectives of this project are:

(1) Enable engineers and scientists to conduct continuing studies under actual "full scale" operational conditions of a waste water reclamation project in Antelope Valley.
(2) To demonstrate that sufficient algae and nutrient removal can be realized to prevent excess biological growth, and to maintain aesthetic levels of clarity, and to assure an adequate habitat for fish life in recreational lakes.
(3) To ensure a safe degree of enteric pathogen and virus destruction to permit safe use of reclaimed waste water.
(4) To provide controls for any insect or noxious plant problems which occur in conjunction with such projects.
(5) To develop a "Manual of Practices" that would have widespread application in the field of waste water reclamation.
(6) Demonstrate the acceptability by the public of the use of reclaimed waste water for establishing attractive aquatic recreational facilities, especially in water short desert areas.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17080 HHV

TITLE OF PROJECT: "Study of an Integrated Power, Water and Wastewater Complex"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
New York State Atomic and Space Development Authority 230 Park Avenue New York, New York 10017	Mr. John R. Trax Municipal Technology Branch Technology Division Environmental Protection Agency Washington, D. C. 20460

Project Site: New York, New York

DESCRIPTION OF PROJECT

Award Date: August 1, 1971

Project Cost: $210,066

Completion Date: June 30, 1972

Federal Cost: $157,415

Summary:

This project consists of investigating the technical and economic suitability of treating sewage effluents to potable water standards for reuse in potentially watershort areas. It includes an analysis of jointly siting power generating facilities and waste water renovation facilities so that the thermal source can assist in the waste water treatment and water purification process as well as in production of electric power. The project is designed to lead to the actual demonstration and implementation of reuse systems in an actual urban environment and could be a significant step leading to the conservation of our resources and a lessening of the potential impact of water pollution.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as* amended.

PROJECT NUMBER: 801478

TITLE OF PROJECT: "Correlation of Advanced Wastewater Treatment and Ground Water Recharge"

GRANTEE OR CONTRACTOR:

County of Nassau
Mineola, New York

EPA PROJECT OFFICER:
Mr. Robert Mason
EPA, Region II
26 Federal Plaza
Room 847
New York, New York 10007

Project Site:

DESCRIPTION OF PROJECT

Award Date: July 1, 1972

Project Cost: $100,000

Completion Date: January 1, 1973

Federal Cost: $95,000

Summary:

In the near future, the water demands of Long Island may cause serious ground water depletion. Aspects of this problem are already apparent in isolated instances. One direct solution to the problem would be the recharging of ground water with renovated, highly purified waste waters.

To determine the technical feasibility and economic practicality of an integrated recharge system, large-scale study and operational data are required. Such studies can be conducted utilizing the facilities available at the new Wantagh Water Pollution Control Plant.

Such studies would require the objectives of the program to be clearly defined, the practicality of using the plant demonstrated, and the costs of the study defined. Resultant from these studies will be an advanced treatment scheme and compatible recharge method amenable to a future demonstration project whose magnitude and duration would be as found necessary. This project will explore the feasibility of conducting these future studies at the newly constructed Wantagh treatment plant. The programs and cost necessary for completing the future project will be identified.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: CI-72-0025

TITLE OF PROJECT: "Demonstrated Technology and Research Needs for Reuse of Municipal Wastewater"

GRANTEE OR CONTRACTOR:

SCS Engineers
4014 Long Beach Boulevard
Long Beach, California 90807

EPA PROJECT OFFICER:
Dr. Carl Brunner
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Long Beach, California

DESCRIPTION OF PROJECT

Award Date: June 1, 1972

Project Cost: $56,775

Completion Date: June 1, 1973

Federal Cost: $56,775

Summary:

The overall objectives of this project are to:

1. Review existing municipal wastewater reuse projects and their applications including treatment systems used and economics in order to provide data for similar situations.

2. Determine the regions of the country where the use of renovated wastewater will be an attractive water supply alternative in the near-term (year 1980).

3. Determine deficiencies and suggest the needs for future research, development and demonstration efforts for reuse of municipal wastewater.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

WASTEWATER TREATMENT OPTIMIZATION

14.A

WASTEWATER TREATMENT OPTIMIZATION

Computer simulation of various processes has been shown to be a powerful tool in improving the design and operational effectiveness of plants in the chemical process industries. The techniques developed are readily amenable for use in simulation of waste water treatment facilities. Development of computer programs to simulate these facilities will result both in improved operation of present plants and design of future systems.

Federal, state and local regulatory agencies currently do not have the necessary resources to evaluate the day-to-day performance of waste water treatment plants. The data on current plant operations would lend itself to computerized evaluation techniques if suitable programs could be developed. Moreover, the improvement in design of future plants and the concept of computerized plant design itself will depend on a better understanding of the operating criteria which will result from these computerized analyses.

Finally, this project will have to sustain the necessary Research and Development to provide systems for computerized design of plants, Research Analysis, Evaluation of Operation, Maintenance and design alternatives and finally, Systems Optimization. A rapid acceleration of the present level of effort is mandatory if these basic tools are going to be made available to both research and management personnel.

The objective of this program is to develop complete and authoritive relationships in the form of equation, charts, and computer systems to facilitate design simulation and evaluation of individual treatment processes and systems of processes.

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PPB 17090 - Waste Treatment Optimization

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DOY	American Public Works Association	A	14-11
DPX	Quirk, Lawler and Matusky Engineers	A	14-12
DRU	Bechtel Corporation	A	14-13
EEM	Engineering Science, Inc.	A	14-14
EEV	O'Brien and Gere	B	14-15
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GNQ	Roy F. Weston, Inc.	A	14-26
14-12-410	Process Research, Inc.	A	14-27

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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FINAL REPORTS AVAILABLE

Report Number	Title/Author	Source
17090---12/68	Cost of Wastewater Treatment Processes; by Dorr-Oliver, Inc.	NTIS - PB 187 760
17090---06/69	Cost and Performance Estimates for Tertiary Wastewater Treating Processes; by Robt. A. Taft Water Res. Ctr., Cincinnati, Ohio	NTIS - PB 189 953
17090---10/69	A Generalized Computer Model for Steady-State Performance of the Activated Sludge Process; by Robt. A. Taft Water Res. Ctr., Cincinnati, Ohio	NTIS - PB 192 764
17090---07/70	Cost to the Consumer of Collection and Treatment of Wastewater; by Robt. Smith and Richard G. Eilers, The AWTR Lab., EPA, Cincinnati, OH	(Under review)
17090---10/70	Simulation of the Time-Dependent Performance of the Activated Sludge Process Using the Digital Computer; by AWTR Lab., FWQA, Cincinnati, Ohio	(Under review)
17090DOY12/70	Feasibility of Computer Control of Wastewater Treatment; by American Public Works Assoc., Chicago, Illinois	GPO - $1.00
17090DRU07/70	Cost Estimating Guidelines for Wastewater Treatment Systems; by Bechtel Corp., San Francisco, CA	(Under review)
17090EHQ09/69	Mathematical Model of Sewage Sludge Fluidized Bed Incinerator Capacities and Costs; by General American Transportation Corp. and General American Research Div., Niles, Ill.	NTIS - PB 189 295
17090EHQ09/70	Mathematical Model of Recalcination of Lime Sludge with Fluidized Bed Reactors; by General American Transportation Corp., Niles, Illinois	GPO - 55¢
17090FJW03/70	A Mathematical Model of a Final Clarifier for the Activated Sludge Process; by Rex Chainbelt, Inc., Milwaukee, Wisc.	(Under review)
17090FKC09/69	Mathematical Model of Tertiary Treatment by Lime Addition; by General American Transportation Corp., General American Research Division, Niles, Illinois	NTIS - PB 190 170
17090FTA07/69	Mathematical Model of Electrodialysis Process; by Process Research Inc., Cambridge, Mass.	GPO - 70¢

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 DAN (14-12-462 Mod. 4)

TITLE OF PROJECT: Study to Establish Construction, Operating and Maintenance Cost for Unit Processes of Conventional Wastewater Treatment Plants

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
Black and Veatch 1500 Meadow Lake Parkway Kansas City, Missouri 64114	Mr. Walter F. McMichael National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Kansas City, Missouri

DESCRIPTION OF PROJECT

Award Date:	September 25, 1968	**Project Cost:**	$289,117
Completion Date:	May 18, 1971	**Federal Cost:**	$289,117

Summary:

The objective of this project is to develop capital cost and operating cost data for conventional wastewater treatment unit processes, and develop and present criteria for determining the qualitative and quantitative manpower requirements for operating, maintaining and administering conventional wastewater treatment plants. End product will be a "Manpower Planning Criteria Manual" which will contain titles and descriptions of positions, staffing tables and employee qualifications which will relate the required personnel to the treatment processes. Extension of time and funds made to develop operating and maintenance costs and manpower planning criteria for sewage treatment lagoons.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 DDP

TITLE OF PROJECT: "4th International Conference on Water Pollution Research"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
U. S. of America Nat'l Comm. Washington, D. C.	Mr. Frank Middleton National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Prague, Czechoslovakia

DESCRIPTION OF PROJECT

Award Date:	August 16, 1968	Project Cost:	$38,610
Completion Date:	July 13, 1969	Federal Cost:	$10,000

Summary:

The conferences are designed to report and record current outstanding research in water pollution control from all parts of the world. By this means it is intended to stimulate cooperation among nations in the conduct of research, to shorten the time lag between development of research findings and practical applications, to reduce multiple efforts using the same approaches on the same problems, and to promote international good will among researchers from all nations by providing a common meeting ground to share problems and results.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 DDX (14-12-463)

TITLE OF PROJECT: "Mathematical Model for Waste Water Treatment by Ion-Exchange"

GRANTEE OR CONTRACTOR:

IIT Research Institute
10 West 35th Street
Chicago, Illinois 60616

Project Site: Chicago, Illinois

EPA PROJECT OFFICER:
Mr. Robert Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date:	October 8, 1968	Project Cost:	$26,194
Completion Date:	May 31, 1969	Federal Cost:	$26,194

Summary:

To develop a mathematical model for the ion-exchange removal of specified ions or demineralization as part of an overall process for waste treatment. The mathematical model will be a computational scheme that quantitatively expresses the quality of the effluent stream and the capital and operating cost, in terms of both the characteristics of the influent stream and the design and operating decisions selected.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (Research)
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 DHA

TITLE OF PROJECT: Tertiary Treatment by Activated Carbon Adsorption

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Texas A&M Research Foundation P. O. Faculty Exchange H College Station, Texas 77843	Robert Smith National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: College Station, Texas

DESCRIPTION OF PROJECT

Award Date: October 2, 1968 Project Cost: $68,853

Completion Date: August 31, 1971 Federal Cost: $63,114

Summary:

The project objective is to develop a mathematical model for counter-current moving-bed activated carbon adsorption and determine its validity and limitations. The purpose of the model is to provide a method for the design of counter-current moving-bed activated carbon adsorption units from batch data. A 100 gallon per day pilot plant located at the University wastewater treatment plant is being used to verify the model.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 DOY
14-12-580
TITLE OF PROJECT: "Studying Computer Control of Sewage Treatment and Water"

GRANTEE OR CONTRACTOR:

American Public Works Association
1313 East 60th Street
Chicago, Illinois 60637

EPA PROJECT OFFICER:

Richard Eilers
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Chicago, Illinois

DESCRIPTION OF PROJECT

Award Date: June 30, 1969 Project Cost: $27,236

Completion Date: September 30, 1970 Federal Cost: $27,236

Summary:

To study the advantages and limitations associated with the use of computers in the management and control functions of municipal wastewater treatment facilities. Guidelines will be established which can be applied to determining whether computer control is feasible for particular sewage treatment plants.

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 DPX
14-12-515

TITLE OF PROJECT: "Computer Program for Centrifugal Dewatering of Sludge"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Quirk, Lawler & Matusky Engineers 505 Fifth Avenue New York, New York 10017	R. Smith National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: New York, New York

DESCRIPTION OF PROJECT

Award Date: June 26, 1969	Project Cost: $22,065
Completion Date: March 31, 1970	Federal Cost: $22,065

Summary:

Develop a mathematical model describing cost and performance for sludge dewatering by centrifugal separation. The principal phases proposed for project execution are summarized as follows:

1) Develop a mathematical model for centrifuge dewatering performance.
2) Determine correlation constants for performance model using data from operating installations.
3) Develop mathematical models for equipment layout, capital cost and operating cost requirements.
4) Assemble component models into an integrated computer program for analyses of centrifuge selection, layout and cost requirements.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 DRU (14-12-582 Mod.)

TITLE OF PROJECT: Cost Estimating Guidelines for Advanced Wastewater Treatment Systems

GRANTEE OR CONTRACTOR:

Bechtel Corporation
50 Beale Street
San Francisco, California 94419

EPA PROJECT OFFICER:

Mr. W. F. McMichael
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: San Francisco California

DESCRIPTION OF PROJECT

Award Date: October 29, 1969 Project Cost: $112,985

Completion Date: December 28, 1970 Federal Cost: $112,985

Summary:

The objective of this project is to develop uniform guidelines for estimating the costs of waste treatment systems. These guidelines will be made available to contractors presently working on mathematical models for various processes. They will also be incorporated into a manual for future use. Modification covers preparation of order-of-magnitude capital cost estimates based on Independent Physical/Chemical (IPC), Conventional Tertiary (CT), and Conventional Tertiary-Biological Nitrification/Denitrification (CTND) processes.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 EEM (14-12-819)

TITLE OF PROJECT: "Microscreening Equipment Test and Mathematical Model"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Engineering Science, Inc. 150 East Foothill Boulevard Arcadia, California 91006	Mr. John Convery Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Arcadia, California

DESCRIPTION OF PROJECT

Award Date:	October 28, 1969	Project Cost:	$187,210
Completion Date:	October 27, 1970	Federal Cost:	$187,210

Summary:

Development of a mathematical model for microscreening of secondary effluent. Part of the work scope is to identify the specific secondary effluent characteristics which are directly related to the performance of the microscreening installation. The model should also include the effect of screening fabric characteristics and mode of operation. With these input characteristics specified by the process designer, the mathematical model should then be capable of predicting the performance of the process in removing suspended solids form secondary effluent and of calculating the capital cost and the operating and maintenance cost associated with operation of the microscreen. The model will be presented in the form of a computer (FORTRAN language) subroutine for use with an executive routine.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *,*
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 EEV
14-12-598

TITLE OF PROJECT: "Effect on Flow Equalization of Conventional Treatment"

GRANTEE OR CONTRACTOR:

O'Brien & Gere
Consulting Engineers and Land Surveyors
1050 West Genesee Street
Syracuse, New York 13204

Project Site:
Newark, New York

EPA PROJECT OFFICER:

C. L. Swanson
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: June 30, 1969

Completion Date: August 31, 1970

Project Cost: $153,434

Federal Cost: $153,434

Summary:

The objective of this study is to establish the effects of flow equalization on treatment plant operation and pollutant removal efficiencies, and to develop design and cost data associated with uniform flow conditions. Conventional treatment plants are designed on the basis of average flow, although diurnal flow variation normally ranges from 50 to 150 percent of average. Computer simulation studies have indicated that a significant improvement in pollutant removal efficiency can be achieved by operation at constant flow.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

CLEAN WATER

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 EHQ
14-12-415

TITLE OF PROJECT: "Development of a Mathematical Model of Sewage Sludge Fluidized Bed Incinerators"

GRANTEE OR CONTRACTOR:
General American Transportation Corporation
7449 North Natchez Avenue
Niles, Illinois 60648

EPA PROJECT OFFICER:
Robert Smith
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Nile, Illinois

DESCRIPTION OF PROJECT

Award Date: June 1, 1969

Project Cost: $14,604

Completion Date: Dec. 31, 1969

Federal Cost: $14,605

Summary:

To include the development of a computer program subroutine for recalcination of lime as part of the on going contract to develop a mathematical model of sludge incineration utilizing a fluidized bed incinerator. The report will be a subroutine which will compute design parameters and cost for the recalcination process.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 EHX

TITLE OF PROJECT: "International Symposium and State of the Art for Waste Treatment Lagoons"

GRANTEE OR CONTRACTOR:
Missouri Basin Engineering Health Council
A. E. Williamson, Chairman
State Office Building
Cheyenne, Wyoming 82001
Project Site: Cheyenne, Wyoming

EPA PROJECT OFFICER:
Mr. Otmar O. Olson
EPA, Region VII
1735 Baltimore Avenue
Kansas City, Missouri 64108

DESCRIPTION OF PROJECT

Award Date: August 1, 1969
Project Cost: $34,631

Completion Date: July 31, 1970
Federal Cost: $32,900

Summary:

This conference is planned to assess the use of stabilization, anaerobic and aerated lagoons in the treatment of domestic waste and domestic waste combined with various industrial wastes. To evaluate design criteria with various waste loading rates on systems under different geographic and climatic conditions, and determine effectiveness of their application. To compile and disseminate this information in the proceedings of the conference and in a State of the Art (and research needs) publication.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 ELL

TITLE OF PROJECT: "Optimal Design of Waste Treatment Systems"

GRANTEE OR CONTRACTOR:

Kansas State University
Dept. of Chemical Engineering
Kansas State University
Manhattan, Kansas 66502
Project Site: Manhattan, Kansas

EPA PROJECT OFFICER:

Robert Smith, AWTRL
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

DESCRIPTION OF PROJECT

Award Date: July 1, 1970

Project Cost: $71,784

Completion Date: May 31, 1972

Federal Cost: $60,907

Summary:

The primary objective of this study is the development of optimal designs for waste treatment systems and techniques for arriving at optimal designs. More specifically the program has several objectives, namely, the analysis and optimization of waste treatment systems using a high speed digital computer, and the application of "System Synthesis" techniques in the designing of optimal waste treatment systems.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 EPW

TITLE OF PROJECT: "Center of Competence for Document Processing in the Area of Wastewater Treatment"

GRANTEE OR CONTRACTOR:

The University of Texas
at Austin
Austin, Texas 78712

EPA PROJECT OFFICER:
G. J. Putnicki
Region VI
1114 Commerce Street
Dallas, Texas 752[illegible]

Project Site: Austin, Texas

DESCRIPTION OF PROJECT

Award Date: November 21, 1969

Completion Date: January 31, 1973

Project Cost: $89,455

Federal Cost: $78,287

Summary:

The objective of this project will be to provide the Water Resources Scientific Information Center with abstracts of source materials resulting from research in the area of wastewater treatment.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 ,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 FDO (68-01-0014)

TITLE OF PROJECT: Domestic Algal Lagoon Performance and the State of Lagoon Technology

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Ryckman, Edgerley, Tomlinson and Associates 225 South Meramec Avenue St. Louis, Missouri 63105	Mr. F. M. Middleton Robert A. Taft Water Research Division Columbia Parkway Building Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: St. Louis, Missouri

DESCRIPTION OF PROJECT

Award Date:	June 19, 1970	. oject Cost:	$60,514
Completion Date:	July 1971	Federal Cost:	$60,514

Summary:

The objective of this project is to investigate algal lagoon performance and the state of lagoon technology, and specifically to include: (1) An evaluation of the proceedings of the "Second International Symposium for Waste Treatment Lagoons"; (2) Obtain and evaluate all available oxidation pond operating data; (3) Obtain and evaluate all available data with respect to lagoons in the states located in the FWQA Great Lakes Region, Southeast Region and Southwest Region; (4) Review the adequacy of lagoon performance with key State Engineers; and (5) Performance data collection from State pollution agencies and other installations who performed analysis on lagoons. Extension of time and funds made to incorporate extensive new information relating to lagoons into the project report (Contract No. 14-12-892 - 17090 FDO).

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 (CONTRACT) *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 FJU
(14-12-148)

TITLE OF PROJECT: "Characterization of the Activated Sludge Process at the Hyperion Treatment Plant"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Los Angeles City Board of Public Works Room 373, City Hall Los Angeles, California 90012	Dr. Robert L. Bunch Robert A. Taft Research Division Columbia Parkway Bldg. Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Los Angeles, Calif.

DESCRIPTION OF PROJECT

Award Date:	June 1, 1968	Project Cost:	$77,174
Completion Date:	June 1, 1969	Federal Cost:	$77,174

Summary:

The objective of the testing program to be carried out at the Hyperion Treatment Plant in Los Angeles can be divided conveniently into two parts. The first objective will be to develop a set of plant characteristics which will represent the average (24 hr. composite) performance of the plant.

The second objective (corresponding to Phase II) will be to study the time dependent or transient behavior of the plant by varying the influent stream in some predetermined way as a function of time and then making measurements of flow and concentration at various stations as a function of time (at one hour intervals). The purpose of Phase II will be to generate the necessary data to develop a dynamic or time dependent mathematical model for the activated sludge process.

The model will then be used to select the most practical method for controlling the plant to achieve improved plant performance and a more uniform water quality at the effluent weirs of the final settler.

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 FQJ

TITLE OF PROJECT: "Biological Concepts for Design and Operation of the Activated Sludge Process"

GRANTEE OR CONTRACTOR:

Oklahoma State University
Stillwater, Oklahoma 74074

EPA PROJECT OFFICER:
Mr. Robert Smith
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Stillwater, Oklahoma

DESCRIPTION OF PROJECT

Award Date: June 2, 1970

Project Cost: $33,599

Completion Date: June 30, 1971

Federal Cost: $31,481

Summary:

The objective of this project is the coorelation and conceptual analysis of all data covered under Grants WP-00325, WP-00075, WP-00786, and related work carried out under other types of sponsorship, and the preparation and submission of a final report on the conceptual principles governing design and operation of the activated sludge process in terms which can be understood and used by practicing engineers with a wide variety of backgrounds as well as researchers in the field.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2, *Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 FWA (68-01-0073)

TITLE OF PROJECT: Guide to the Preparation of Operational Plans for Sewage Treatment Facilities

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Synectics Corporation 4790 Wm. Flynn Highway Allison Park, Pennsylvania 15101	Mr. W. F. McMichael National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Allison Park, Pennsylvania

DESCRIPTION OF PROJECT

Award Date:	June 10, 1971	Project Cost:	$39,199
Completion Date:	August 31, 1972	Federal Cost:	$39,199

Summary:

The objective of this contract is to prepare a manual of guidelines for use by consulting engineers and treatment plant supervisors that will allow them to produce manuals pertaining to the management, operation, and maintenance of a sewage treatment facility.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 FYZ (14-12-946)

TITLE OF PROJECT: The Application of Industrial Engineering Techniques to Conventional and Advanced Wastewater Treatment Systems

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Hittman Associates, Inc. 9190 Red Branch Road Columbia, Maryland 21043	Mr. W. F. McMichael National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Columbia, Maryland

DESCRIPTION OF PROJECT

Award Date:	October 23, 1970	Project Cost:	$96,452
Completion Date:	October 22, 1971	Federal Cost:	$96,452

Summary:

The objective of this project is to evaluate and demonstrate the application of industrial engineering techniques to the management and operational analysis of conventional and advanced wastewater treatment systems. Emphasis will be placed on development of design criteria for use in the FWQA construction grant program. Techniques evaluated will be both function and equipment oriented.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 GAF (68-01-0013)

TITLE OF PROJECT: Combined Waste/Heat Treatment

GRANTEE OR CONTRACTOR:	**EPA PROJECT OFFICER:**
URS Research Company 155 Bovet Road San Mateo, California 94402	Mr. Gerald Stern National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: San Mateo, California

DESCRIPTION OF PROJECT

Award Date: December 31, 1970 **Project Cost:** $34,530

Completion Date: September 30, 1971 **Federal Cost:** $34,530

Summary:

The objective of this project is to investigate the technical, operational, and economic feasibility of employing waste heat from power plants to heat wastewaters in order to improve efficiency of biological waste treatment processes, with emphasis on cold climate areas.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 6a2,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17090 GNQ (14-12-933)

TITLE OF PROJECT: Development of Design Manual for Advanced Waste Treatment Processes - Upgrading Existing Plants

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Roy F. Weston, Inc. 1326 Lewis Lane West Chester, Pennsylvania 19380	Mr. C. L. Swanson Office of Water Programs Environmental Protection Agency Washington, D. C. 20460

Project Site: West Chester, Pennsylvania

DESCRIPTION OF PROJECT

Award Date: August 25, 1970 Project Cost: $62,530

Completion Date: February 24, 1971 Federal Cost: $62,530

Summary:

The purpose of the design manual is to provide the design engineer and regulator agencies with up-to-date information on advanced waste treatment processes. Available information will be compiled in a form which can be readily utilized and detailed information will be included on process and equipment options, system design, and conceptual plans and specifications. Present two technical seminars to be repeated four times. Content of the seminars shall be procedures and considerations involved in the design of the advanced waste treatment plant at Piscataway, Maryland, and one seminar on the handling, treatment and ultimate disposal of sludges at the plant.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5 *, Federal Water Pollution Control Act (PL 84-660), as amended.*

PROJECT NUMBER: 17090 (14-12-410)

TITLE OF PROJECT: "Mathematical Model of the Electrodialysis Process for Advanced Waste Treatment"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
	Mr. J. Roesler
Process Research, Inc.	National Environmental Research Center
56 Rogers Street	Environmental Protection Agency
Cambridge, Massachusetts 02142	Cincinnati, Ohio 45268

Project Site: Cambridge, Massachusetts

DESCRIPTION OF PROJECT

Award Date:	June 28, 1968	Project Cost:	$32,590
Completion Date:	June 30, 1969	Federal Cost:	$32,590

Summary:

The objective of this contract is to develop a mathematical model of the electrodialysis process for use in preliminary design and simulation of wastewater treatment processes. A complete description of the feed stream will be supplied as input as well as a list of decision parameters which describe the mode of operation required. The subroutine will then compute the characteristics of the effluent streams and the cost of building and operating the process.

WASTEWATER TREATMENT
INSTRUMENTATION AND AUTOMATION

15.A

WASTEWATER TREATMENT
INSTRUMENTATION AND AUTOMATION

Instrumentation and automation of wastewater systems and treatment plants for process control is a relatively new concept. Many instruments for water analyses are on the market, but they have not been adequately evaluated or tested in wastewater treatment facilities. No automated wastewater systems or plants have been built and evaluated.

This research entails: (1) determination of key variables for monitoring and control of sewerage systems and treatment plants. (2) Evaluation of instruments, control devices and control strategies by mathematical modeling, laboratory work or field study. (3) Determination and demonstration of optimum control strategies through the use of cost-effectiveness, performance and/or reliability.

Progress to date has been (1) completion of in-house analysis of process variables, cost-effectiveness of controlling selected variables and a partial assessment of available instrumentation to define program priorities for laboratory and field testing. (2) Completion of evaluation of an auto analyzer for measuring phosphorus and in feedback control for phosphorus removal.

Project Index
PPB 17110 - Wastewater Treatment Instrumentation and Automation

17110	Grantee or Contractor	Project Status*	Page
HJW	City of Palo Alto	C	15-5
CI-72-0026	Raytheon Company	C	15-6

*Project Status
A - Completed and Final Report Available
B - Final Report in Review or Printing
C - Work Continuing
D - Project Terminated
E - Completed but no Formal Report to be Issued

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INFORMATION SHEET

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5, Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: 17110 HJW

TITLE OF PROJECT: "Advanced Control Algorithms for Activated Sludge Process"

GRANTEE OR CONTRACTOR:

City of Palo Alto
250 Hamilton Avenue
Palo Alto, California 94301

EPA PROJECT OFFICER:
Mr. Joseph Roesler
Advanced Waste Treatment Research Laboratory
National Environmental Research Center
Environmental Protection Agency
Cincinnati, Ohio 45268

Project Site: Palo Alto, California

DESCRIPTION OF PROJECT

Award Date: May 1, 1972 Project Cost: $93,301

Completion Date: April 30, 1973 Federal Cost: $65,200

Summary:

The objectives of this project are:

(1) Evaluate seven schemes for control of the activated sludge process.

(2) Demonstrate the use of a digital computer for the implementation of advanced control methods.

(3) Demonstrate value of advanced control methods on a full scale activated sludge process.

(4) Quantify cost and performance improvements associated with process control.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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INFORMATION SHEET

CLEAN WATER

ENVIRONMENTAL PROTECTION AGENCY
RESEARCH, DEVELOPMENT OR DEMONSTRATION PROJECT

This sheet describes briefly a grant under Section 5,
Federal Water Pollution Control Act (PL 84-660), as amended.

PROJECT NUMBER: CI-72-0026

TITLE OF PROJECT: "State-of-the-Art Report on Instrumentation and Automation of Municipal Wastewater Treatment Facilities"

GRANTEE OR CONTRACTOR:	EPA PROJECT OFFICER:
Raytheon Company P. O. Box 360 Portsmouth, Rhode Island 02871	Mr. Joseph Roesler Advanced Waste Treatment Research Laboratory National Environmental Research Center Environmental Protection Agency Cincinnati, Ohio 45268

Project Site: Portsmouth, Rhode Island

DESCRIPTION OF PROJECT

Award Date:	June 1, 1972	Project Cost:	$158,458
Completion Date:	May 31, 1973	Federal Cost:	$158,458

. Summary:

The purpose of this project is to furnish a comprehensive report on current and potential instrumentation and automation applications for municipal wastewater control and treatment facilities. The report shall consider the classic municipal treatment plant and auxiliary excess flow (urban runoff) plants. This report will include the results of (1) a comprehensive literature search, and (2) a users' experience survey based on field investigations pertaining to analytical methodology, and flow and process control technology, (3) design of alternative control strategies for each unit process, (4) preparation of plant layouts for hypothetical 1 and 10-MGD facilities, (5) estimates of the costs incurred, benefits derived and operating problems associated with actual or proposed control schemes, and (6) delineation of future research needs.

ADDRESS INQUIRIES TO EPA PROJECT OFFICER

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